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Festschrift Anniversary Issue Numéro jubilaire

DANIEL JONES

zum 80. Geburtstag gewidmet
dedicated to his 80th birthday
à l’occasion de son 80^e anniversaire

Hochverehrter Jubilar!

Wenn ich als Herausgeber der «Phonetica» zugleich im Namen der Mitherausgeber Ihnen zur Vollendung Ihres 80. Lebensjahres meine Glückwünsche ausspreche und als Zeichen unserer Verehrung den siebenten Band als Festschrift widme, kann es meine Aufgabe nicht sein, auf Ihr wissenschaftliches Lebenswerk und auf Ihre Bedeutung als Lehrer der Phonetik hinzuweisen: seit Jahrzehnten stehen sie den Älteren wie den Jüngeren vor Augen, von denen so viele mittelbar und unmittelbar Ihre Schüler sind.

Als ich das Glück hatte, Ihnen, verehrter Herr Jones, vor nun einem Menschenalter auch persönlich zu begegnen, waren Sie – in gewisser Weise der Nachfolger von Sievers und Jespersen – längst der Lehrer der Phonetik weit über die Grenzen Englands hinaus. Und daneben waren Sie für mich der treue Freund Diedrich Westermanns.

Unser Briefwechsel begann, als Sie nach dem Kongreß von 1932 den Londoner Kongreß vorbereiteten. Als ich 1937 das «Archiv für vergleichende Phonetik» begründete, gehörten Sie zu den ersten Mitherausgebern. Und so wie Sie Diedrich Westermann Ihre Freundschaft durch den Ersten Weltkrieg hindurch bewahrt haben, so sind Sie Mitherausgeber des «Archivs» geblieben, bis es in den Wirren des Krieges sein Erscheinen einstellen mußte. Als sich 1938 die Berliner «Gesellschaft für Phonetik» in eine «Internationale Gesellschaft» umwandelte, haben Sie auf Bitten aller Mitglieder den Vorsitz übernommen. Aber die Zeit war der Pflege internationaler Beziehungen nicht günstig. Und so findet der Vierte der internationalen Kongresse, die wir 1932 alle drei Jahre zu veranstalten gehofft und beschlossen hatten, erst jetzt – fast dreißig Jahre nach dem Amsterdamer Kongreß – statt. Es ist ein schmerzlicher Gedanke, daß Sie, hochverehrter, lieber Herr Jones, der Sie den drei vorangegangenen ihr Gepräge gegeben haben, in Helsinki nicht mehr persönlich anwesend sein werden. Aber Ihre Schüler werden für Sie sprechen und werden an Ihrer Stelle stehen.

Wie fern und wie nah zugleich scheinen die Anfänge Ihrer wissenschaftlichen Arbeit, die nun schon ein halbes Jahrhundert von einer veränderten Gegenwart trennt: fern, weil auch die Überlebenden jener Tage, wo sie sich wieder begegnen, dies in einer gewandelten Welt tun, in der ein schmerzliches Einvernehmen fast das einzige Band bedünken mag, das sie mit ihrer eigenen Vergangenheit und der ihrer Freunde verknüpft; nah, weil das damals Erarbeitete und Mitgeteilte eine wesentliche Grundlage heutiger Arbeit und Lehre geblieben ist. Wir dürfen dankbar sein, in Ihrem Werk und in Ihrer Person ein Zeugnis für die weltweite Bedeutung der Phonetik in diesen Jahrzehnten zu besitzen. An Ihrem Ehrentage verbinden sich die Erinnerungen an das Geleistete und die Verehrung und Dankbarkeit, die Ihnen von allen Seiten entgegengebracht werden, mit unseren Wünschen für die Jahre, die Ihnen ein gnädiges Geschick schenkt.

Münster, im September 1961 *Eberhard Zwirner*

Tabula gratulatoria

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F. Trojan, Wien
H. Weinrich, Kiel
W. Winter, Austin (Texas)
L. Zabrocki, Poznań

Phonetica 7: 4–18 (1961).

Phonologie der Sprechpause

Von HARALD WEINRICH, Kiel

Es ist verständlich, daß die Phonetik als die Wissenschaft von den Sprachlauten im allgemeinen wenig Neigung verspürt, neben ihrem Gegenstand auch von der Verneinung ihres Gegenstandes zu handeln: von der Sprechpause[1]. Nachdem aber die phonologische Betrachtungsweise mit innerer Notwendigkeit die Konsequenz hervorgebracht hat, daß wir bei dem Spiel der phonematischen Oppositionen allgemein mit einem Phonem «Null» rechnen müssen, ebenso wie die Mathematik selbstverständlich mit einer Zahl «Null» rechnet, ist die Zeit gekommen, auch die Sprechpause stärker in die phonetisch-phonologischen Überlegungen miteinzubeziehen. Wohlverstanden: Gegenstand der folgenden Darstellung ist nicht das Phonem «Null», eine bloß gedachte Einheit, sondern die reale Sprechpause beliebiger Dauer in ihrem phonologischen Status. Es ist einleuchtend, daß diese Überlegungen nicht auf der Basis einer Wortphonetik möglich sind. Wir müssen darüber hinaus aber nun in Frage stellen, ob sogar die Satzphonetik eine zureichende Basis ist. Die Satzphonetik – der Name ist nicht ganz eindeutig – betrachtet als Grundeinheit die satzphonetische Gruppe als lautliches Kontinuum von Sprechpause zu Sprechpause. Die satzphonetische Gruppe ist gewöhnlich identisch mit einem Satz oder einer Sinngruppe, kann aber auch das bloße Fragment einer Sinngruppe umfassen, wenn der Sprecher eine Sprechpause aus anderen Motiven als um der Sinngebung oder Sinnverdeutlichung willen macht. Auch die rhetorische Figur der reticentia (*Quos ego*...!) schafft eine Sprechpause. All das ist für die folgenden Überlegungen gleichgültig; wir gehen nämlich über die satzphonetische Gruppe hinaus, beziehen die Sprechpausen ohne Rücksicht auf ihre Motivierung mit in die Überlegung ein und können damit einen längeren Sprechakt (Erzählung, Monolog, Vortrag, Plauderei) als Einheit aus den Elementen satzphonetische Gruppe und Sprechpause auffassen. Das ist mehr als «Satzphonetik».

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[1] Es gibt jedoch einige Untersuchungen: *E. und K. Zwirner*, Phonometrischer Beitrag zur Frage der Lesepausen, Arch. néerl. de phon. exp. *13:* 111–128 (1937); *L. Hegedüs*, On the problem of the pauses of speech, Acta ling. Ac. Sc. Hung. *3:* 1–36 (1953); *J. Fónagy*, Die Redepausen in der Dichtung, Phonetica *5:* 169–203 (1960). All diese Untersuchungen gehen jedoch in eine andere Richtung als der vorliegende Aufsatz.

Als Ausgangspunkt unserer Überlegungen mag also der Satz des *Fürsten Trubetzkoy* gelten: «Die ungezwungene menschliche Rede ist ein kontinuierlicher Fluß von Lauten, der nur ganz selten durch kurze Pausen unterbrochen wird[1].» Die einzelnen Wörter oder genauer Morpheme werden nicht hörend, sondern interpretierend erfaßt[2]. Von dieser Voraussetzung her ist es allerdings möglich, von einer Phonetik des Satzes und der Rede in eine kritische Wortphonologie zurückzukehren. Denn die Sprache bietet dem Hörer, der den Lautstrom auf Wörter bzw. Morpheme hin interpretieren muß, eine Hilfe in Gestalt der den jeweiligen Sprachen eigenen Grenzsignale (junctures). Auf diese Frage, die zur Zeit lebhaft diskutiert wird, kann ich hier nicht eingehen[3]; ich muß nur um der folgenden Darstellung willen nachdrücklich darauf hinweisen, daß diese Grenzsignale positive phonetische Elemente (Laute, Lautmodifikationen usw.) sind, niemals Pausen.

Eine längere menschliche Rede kann demnach als eine Abfolge dieser Art aufgefaßt werden: Pause / satzphonetische Gruppe / Pause / satzphonetische Gruppe / Pause / satzphonetische Gruppe / Pause / satzphonetische Gruppe / Pause... Ich gebe ein Beispiel, wobei ich das Zeichen P für die (beliebig lange) Sprechpause, einschließlich der Sprechpause vor oder nach dem Sprechen, einführe:

P *Wahrhaftig,* P *du hast recht!* P *Mein Leipzig lob ich mir!* P *Es ist ein klein Paris und bildet seine Leute.* P

Den Übergang satzphonetische Gruppe / Pause bezeichnen wir nach der üblichen Terminologie als absoluten Auslaut, den Übergang Pause / satzphonetische Gruppe als absoluten Anlaut.

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[1] Proc. 2nd int. Congr. of Phon. Sciences, S. 45.

[2] Vgl. *A. Rosetti,* S. 16 f.

[3] Vgl. *Ch. F. Hockett,* S. 54 f. Dazu *Herbert Pilchs* kritische Bemerkungen unter Berufung auf die Untersuchungen von *Truby* und *Fant* in Proc. 8th Congr. linguist., Oslo 1958, S. 339–341.

Ziel unserer Überlegungen ist nun, von der Sprechpause her Einsichten zu gewinnen, die es uns erlauben, die Anlaut- und Auslautgesetze einer Sprache unter einem einzigen Gesichtspunkt zusammenzufassen und möglichst mit andern Erscheinungen der phonologischen Kombinatorik zu verknüpfen. Unerläßliche Voraussetzung ist dabei aber immer die radikale Abkehr von der Wortphonetik: es geht ausschließlich um den *absoluten* Anlaut und Auslaut; der bloße Wortanlaut und Wortauslaut innerhalb einer satzphonetischen Gruppe gelten als Inlaut. Selbstverständlich ist jeder absolute Anlaut gleichzeitig auch Wortanlaut, jeder absolute Auslaut auch Wortauslaut[1], so daß wir im folgenden die absoluten Anlaut- und Auslautverhältnisse, d. h. die Grenzverhältnisse der Sprechpause, am Wortanlaut und Wortauslaut erörtern können, wobei dann aber immer die Einschränkung zu machen ist, daß man sich dieses Wort nach einer Pause oder vor einer Pause, d. h. am Anfang oder Ende einer satzphonetischen Gruppe, vorstellen muß.

Bei der Untersuchung eines so eminent satzphonetischen Phänomens wie der Variation (Sandhi) macht man häufig die Beobachtung, daß ein Phonem, wenn es sich je nach der satzphonetischen Stellung in eine schwache und eine starke Variante spaltet, die schwache Variante satzphonetisch nach Vokal, die starke Variante aber nicht nur satzphonetisch nach Konsonant, sondern auch im absoluten Anlaut, also nach P, eintreten läßt. Das ist bekanntlich besonders deutlich im Toskanischen zu beobachten; man spricht *la hasa* ‚das Haus' (satzphonetisch nach Vokal), aber *in casa* (satzphonetisch nach Konsonant) und ebenso P/*casa* (absoluter Anlaut, nach P). Das gilt aber nicht nur für die Anlautverhältnisse, sondern entsprechend auch für die Auslautverhältnisse. Als Beispiel gelte die aus der französischen Sprache bekannte sog. Liaison. Wir finden also z. B. den französischen Artikel in zwei phonetischen Varianten, je nach seiner Stellung in der Rede. Vor satzphonetisch folgendem Konsonanten (K) lautet er *le* (ohne «Liaison»: *les femmes*). Ebenso lautet die gleiche Form vor P: *Regarde-les!* Die beiden beschriebenen Erscheinungen haben natürlich ihre Geschichte, sind auch bis zu einem gewissen Grade historisch erklärbar. Die Grundtatsache jedoch, daß die Lautverhältnisse vor bzw. nach Konsonant und vor bzw. nach P überraschend übereinstimmen, entzieht sich einer historischen Erklärung. Wir finden nämlich die gleichen Verhältnisse nicht nur im Portugiesischen (Reibelaut vor Vokal, Zischlaut vor K und P) und im andalusischen Spanisch (Reibelaut vor Vokal, *h* oder «Null» vor K und P), sondern auch in Sprachen, bei denen die entfernteste Verwandtschaft mit dem Italienischen und Französischen ausgeschlossen ist, so z. B. in der amerikanischen Fox-Sprache. Diese kennt nach *Hocketts* Beschreibung ebenfalls die Spaltung einer auslautenden Konsonanz je nach der satzphonetischen Stellung vor Vokal oder vor Konsonant. Auch hier ist die Stellung vor P die der Stellung vor K gleichwertig[1].

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[1] Eine plötzliche reticentia im Innern eines Wortes gewinnt aus der Durchbrechung dieser Regel expressiven Wert.

Die vorgeführten Beispiele betrafen verschiedene Konsonanten und entstammen verschiedenen Sprachen. Sie bezogen sich zudem auf verschiedene satzphonetische Stellungen, die Stellung «vor» und die Stellung «nach». Das folgende Beispiel soll zeigen, daß auch unter den gleichen Bedingungen und in derselben Sprache diese Beobachtungen zu machen sind. Wir wählen den deutschen Laut *χ*, den sog. Ach-Laut, seinem phonologischen Status nach eine Variante[2]. Von diesem Laut können wir feststellen, daß er im absoluten Auslaut, also vor P, vorkommt, etwa in dem Ausruf *Ach!* Wir stellen nun gleichfalls fest, daß er vor K vorkommt, etwa in dem Wort *Nacht.* Umgekehrt können wir negativ feststellen, daß dieser Laut im Deutschen nicht nach K vorkommt. Desgleichen kommt er nicht nach P, d. h. im absoluten Anlaut, vor[3]. Von dem Laut *h* gilt Entsprechendes in anderer Distribution. Wir finden ihn nicht vor K, desgleichen nicht vor P. Andererseits begegnet uns *h* nach P (P/*Hilfe!*), entsprechend auch nach K (*Mithilfe*). Ein ähnliches Verhältnis liegt im Portugiesischen vor: das *l*-Phonem erscheint in zwei Varianten, einem vorderen *l* und einem hinteren (velaren) *l*. Das erstere tritt nach K und nach P (*voz lastimosa*, P/*lastimo*), das letztere vor K und vor P (*alto*, *mal*/P): die Stellung zwischen Vokalen ist im Augenblick unerheblich[4].

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[1] Vgl. *Charles E. Hockett*, S. 277.

[2] Die Variationsbedingungen sind z. T. vokalabhängig und interessieren daher in diesem Zusammenhang weniger.

[3] Der Ich-Laut *(ç)* gehorcht nicht den gleichen Kombinationsgesetzen. Wir finden ihn sowohl vor K und P *(nicht, ich)* als auch nach K und P *(Milch, China)*.

[4] Im neuesten Portugiesisch scheint das *l* indes auch in der Stellung vor Vokal leicht velarisiert zu werden. *Herculano de Carvalho* spricht von «einer gewissen Velarisierung». Da diese ebenfalls satzphonetisch ist, schränkt diese Beobachtung die oben angeführten Beobachtungen nur ein, hebt sie äußerstenfalls auf, steht aber nicht im Widerspruch zu ihnen. Zur Problemlage vergleiche man *José G. C. Herculano de Carvalho*,

Die Beispiele lassen sich in beliebiger Zahl und aus beliebigen Sprachen vermehren. Sie genügen uns indes hier für die Konsequenz, die wir nun ziehen müssen. Die skizzierten lautlichen Verhältnisse lassen sich nicht befriedigend verstehen oder beschreiben, wenn man nicht einer Grundrelation Rechnung trägt, die in der Sprache – jeder Sprache vermutlich – wirksam ist. Die Grundrelation besagt, *daß die Sprechpause (P) den phonologischen Status eines Konsonanten (K) hat.* Wir können sogar pointiert sagen: die Sprechpause ist ein Konsonant, wenn wir nur dabei im Auge behalten, daß dieser Satz nicht umkehrbar ist. Diese Relation ist auch in sich einsichtig, sobald man sich vergegenwärtigt, daß alle menschliche Rede gegliederte Rede ist. Das Lautkontinuum wird auf verschiedene Art gegliedert, z. B. durch den Akzent, den Tonverlauf usw. Die ganz elementare Form der Gliederung des Lautstroms ist jedoch die kontrastierende Distribution, speziell der mehr oder weniger regelmäßige Wechsel von Vokal und Konsonant. Konsonanten unterbrechen die Klangfülle der Vokale durch momentane Klangreduktionen. So wird das Wort *Atom* durch seine Konsonanten von der relativ großen Klangfülle der Vokale *a* und *o* auf die relativ niedrige Klangfülle von *t* und *m* reduziert und erhält dadurch sein phonetisches Relief. Je nach dem Klangfüllegrad der beteiligten Vokale und Konsonanten ist der Kontrast groß oder klein. Die größte Klangfülle hat der offenste Vokal *a*. Die geringste Klangfülle haben stimmlose Verschlußlaute, wenigstens in dem Sinne, daß das Explosivgeräusch der stimmlosen Verschlußlaute dem vollen Klang der Vokale am schärfsten entgegengesetzt ist. Zwischen diesen beiden Extremen liegt die Skala der Laute, vom Klangfülleminimum der stimmlosen Verschlußlaute zum Klangfüllemaximum des offensten Vokals Stufe um Stufe (jedoch nicht unbedingt in linearer Progression) ansteigend.

Von dieser Klangfülleskala, deren Charaktere im Hinblick auf die Kontrastfunktion in der Lautabfolge besonders von *Roman Jakobson* untersucht worden sind[1], interessieren uns in diesem Zu-

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Fonologia Mirandesa I, S. 36 f. – Auf das aus der französischen Sprachgeschichte bekannte Problem der Entwicklung des *l* vor Konsonant komme ich in einem eigenen Aufsatz zurück. Er wird zeigen, daß die Entwicklung von frz. *l* den Ergebnissen dieser Untersuchung nicht widerspricht.

[1] Vgl. besonders *R. Jakobson:* Kindersprache, Aphasie und allgemeine Lautgesetze, Uppsala 1941; sowie *R. Jakobson und M. Halle:* Fundamentals of Language, Kap. III und IV. Dort findet man auch weitere Literatur.

sammenhang nur die Extrempunkte[1]. Wir gehen nämlich über *Jakobsons* Darstellung hinaus, indem wir als konsonantisches Extrem dieser Skala nicht mehr die stimmlosen Verschlußlaute auffassen, sondern darüber hinaus auch die Sprechpause in sie einbeziehen. Denken wir uns nämlich den Klangfüllegrad über die stimmlosen Verschlußlaute hinaus noch weiter reduziert, so erreichen wir mit der Sprechpause den absoluten Nullpunkt der Klangfülleskala. Da nun der Kontrastwert eines Konsonanten gegenüber den Vokalen umgekehrt proportional zu seiner Klangfülle wächst (*t* gliedert den Vokalen gegenüber deutlicher als *j*, weil der Kontrast zu den Vokalen größer ist), hat die Sprechpause damit als absolutes Klangfülleminimum gleichzeitig ein Maximum an Kontrastwert gegenüber den Vokalen: eine menschliche Rede ist in *erster* Linie durch die Sprechpausen gegliedert[2]. Die Sprechpause ist damit im Lautsystem der Sprache «lokalisierbar», und wir stellen fest, daß die Sprechpause im System der Konsonanten als Klangfülleminimum die Extremstelle innehat, d. h. jene Stelle, die zu den Vokalen sowohl paradigmatisch als auch syntagmatisch im schärfsten Kontrast steht. Wir drücken das der Einfachheit und Einprägsamkeit halber in einer Formel aus und schreiben:

$$K \longrightarrow P \text{ (min.)}$$

Die Formel ist zu lesen: P ist der vokalfernste Konsonant (minimales K).

Eine Spezifizierung ist notwendig. Sie wird vom Italienischen nahegelegt. Da das Italienische Lang- und Kurzkonsonanten mit phonologischer Gültigkeit unterscheidet, erhebt sich die Frage, ob die Sprechpause den Status eines Kurz- oder Langkonsonanten hat. Die Frage ist um so interessanter, als wir ja über die reale Dauer der Sprechpause a priori keine Aussage machen können und die Dauer auch nicht berücksichtigen wollen. Es zeigt sich in der Tat, daß die reale Dauer der Pause für den phonologischen Status von P ganz unerheblich ist. Die Kombinatorik des Italienischen läßt erkennen, daß die Sprechpause den Status eines Kurzkonsonanten hat, gleich welcher Dauer die Sprechpause ist. Wir finden z. B. im Italienischen die Lautgruppe *tr* im absoluten Anlaut, d. h. nach

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[1] Daher kann ich mich auch für meine Zwecke mit dem summarischen Begriff der Klangfülle zufriedengeben. Er ist offen für alle Präzisierungen und Spezifizierungen etwa im Sinne *Jakobsons*.

[2] Man denke zur Veranschaulichung an das Morse-Alphabet, wo die gliedernde Funktion der (Sende-)Pause ganz evident ist.

P(P/*tre*). Wir finden sie daher auch nach K, z. B. in dem Wort *chiostro*. Es gibt aber kein italienisches Wort, das vor *tr* noch eine Langkonsonanz duldete. Unsere Relation ist also überhaupt nur aufrechtzuerhalten unter der Voraussetzung, daß P ein Kurzkonsonant ist.

Wir wollen jedoch die Berechtigung unserer Formel nicht aus dem Kontrastprinzip, sondern aus der Evidenz der Ergebnisse ableiten, die mit dieser Formel zu gewinnen sind. Wir wenden daher unsere Betrachtungsweise nun auf ein konkretes Problem an, nämlich die sog. Auslautverhärtung, die in den verschiedensten Sprachen und in den verschiedensten Sprachepochen auftritt. Im Deutschen wird also das *–z–* in *lesen*, sowie es in den Auslaut tritt, zu *–s* «verhärtet», d. h. desonorisiert. Das gilt für alle stimmhaften Konsonanten, soweit sie zu einem stimmlosen Pendant in Opposition stehen, also nicht für *l*, *r*, *m*, *n*. Wir schauen nun sogleich auf die Stellung vor K und finden, daß die stimmhaften Konsonanten in dieser Stellung ebenfalls desonorisiert werden: *er liest (–st)*, *er liebt (–pt)*, aber *lesen (–z–)*, *lieben (–b–)*. Die beiden Beobachtungen gehören zusammen, und zwar – korrekt beschrieben – in der folgenden Weise: Wenn stimmhafte Konsonanten in einer Sprache (wie hier im Deutschen) vor K nicht vorkommen, kommen sie auch vor P nicht vor (und werden z. B. desonorisiert oder «verhärtet»). Die Prager Phonologie hat diese Auslautverhärtung als eine Art der Neutralisation angesehen. Im Auslaut werden im Deutschen die Oppositionen der Sonorisierungskorrelation aufgehoben, und an die Stelle der in Opposition stehenden Phoneme *z:s*, *b:p* tritt das jeweilige Archiphonem, vertreten durch eines der beiden Phoneme, in diesem Fall die stimmlosen Konsonanten *s* und *p*. So nützlich der Begriff der Neutralisation auf anderen Gebieten der Phonologie sein mag, hier ist er überflüssig, wenn man an der Relation K ⟶ P (min.) festhält. Denn nun erscheint die sog. Auslautverhärtung nur als ein Sonderfall der Desonorisierung vor Konsonant[1]. Der Laut *s* in *liest* und in *lies*/P ist phonetisch gleich, weil er auch phonologisch-distributionell den gleichen Status hat. Ein auslautendes *–l (schnell)* wird hingegen im absoluten Auslaut, d. h. vor P, nicht verhärtet, obgleich das phonetisch natürlich möglich wäre, weil es auch im Inlaut vor Konsonant nicht desonorisiert wird *(Kälte)*.

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[1] Die Gründe für diese Desonorisierung stehen hier nicht zur Debatte. Wir betrachten die Desonorisierung nur als Voraussetzung unserer Relation K ⟶ P (min.).

Das Verhalten des Konsonanten in der Stellung satzphonetisch vor Vokal *(lies es!)* ist hierbei prinzipiell ohne Belang. Was das Deutsche betrifft, so kommt der Fall überhaupt nicht vor, da jedem vokalisch anlautenden Wort ein Glottisschlag (Knacklaut), also ein Konsonant, vorgeschaltet ist. Das gilt jedoch nicht für jene slawischen Sprachen wie das Russische, die die Auslautverhärtung, nicht aber den Glottisschlag kennen. Das Verhalten der Konsonanten vor Vokal einerseits und vor K und P andererseits gehorcht eigenen Gesetzen, die über unsere Grundrelation K ⟶ P (min.) hinausgehen, ihr jedoch nicht widersprechen[1].

Eine Gegenprobe aus dem Französischen mag die voraufgehenden Überlegungen erhärten. Jeder Französisch-Lehrer weiß, wie schwer es ist, deutschen Schülern bei der französischen Lautgebung die Auslautverhärtung abzugewöhnen. Denn das Französische kennt die Auslautverhärtung nicht. Alle Konsonanten, die stimmlosen wie die stimmhaften, sind im absoluten Auslaut möglich: *lutte (–t)* neben *rude (–d)*, *neuf (–f)* neben *neuve (–v)*. Genauer gesagt: die stimmhaften Konsonanten bleiben auch im Auslaut von den stimmlosen Konsonanten durch ein phonetisches Merkmal unterschieden. Es braucht jedoch nicht notwendig das Merkmal des Stimmtons zu sein; dieser kann durch das Merkmal der Nichtgespanntheit vertreten werden (s. u.). Woran liegt das? Die historische Erklärung hilft uns hier nicht weiter. Das Altfranzösische kannte nämlich die Auslautverhärtung. Wir finden in den Texten die Formen *lonc* (< *longum*) *orp* (< *orbum*). Die Frage verschärft sich also nur: warum hat das Neufranzösische keine Auslautverhärtung, wo das Deutsche und sogar das Altfranzösische Auslautverhärtung haben?

Eine Antwort kann vielleicht aus der synchronischen Strukturanalyse kommen. Wir sehen die Verhältnisse wiederum vor dem Hintergrund der satzphonetischen Grundrelation K ⟶ P (min.). Im Deutschen werden sth. Konsonanten vor K desonorisiert, im Maße wie sie auch vor P desonorisiert werden. Im Französischen werden nun die sth. Konsonanten vor K nicht zu stl. Konsonanten verhärtet. Sie verlieren zwar durch partielle Assimilation, wie *Bertil Malmberg* gezeigt hat[2], den Stimmton, bleiben aber durch das Merkmal der nicht gespannten Artikulation von ihrem jeweiligen gespannten und stimmlosen Pendant geschieden. Das *–v–* in *sauvetage* wird also vor *t* nicht zu *f*, wie *Nyrop* gemeint hatte, sondern zu *v̥*, wie *Malmberg* transkribiert. *Malmberg* hätte allerdings hinzufügen sollen, daß die gleichen phonetischen Beobachtungen im Französischen auch für den absoluten Auslaut zu machen sind. Wir transkribieren also auch im Auslaut sauve *(–v̥)* und stellen fest, daß die totale «Verhärtung» (Desonorisierung + Spannung der Artikulation) vor K ebenso wie vor P unterbleibt. Es ist also für unsere Betrachtungsweise entscheidend, den absoluten Auslaut nicht isoliert für sich zu betrachten, sondern mit gleichzeitigem Blick auf den satzphonetischen Inlaut in der Stellung vor Konsonant. Denn beide stehen in einem Strukturzusammenhang. Warum also einmal «verhärtet» wird und einmal nicht, warum einmal total, einmal partiell, steht hier nicht zur Debatte[1]. Es geht nur um die strukturalen Querverbindungen in der Sprache, aus denen wir uns die Berechtigung hypothetischer Aussagen vom Typus «Wenn A, dann auch A_1» versprechen. Die hypothetische Aussage lautet in unserm Fall: Wenn Verhärtung (totale oder partielle Desonorisierung) vor P, dann auch Verhärtung vor K.

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[1] Vgl. Vf., Phonologische Studien zur romanischen Sprachgeschichte, Kap. III.

[2] Le système consonantique du français moderne, S. 10 ff. Vgl. auch *A. Martinet*, Economie des changements phonétiques, S. 110 f.

Das ist ein Korollarsatz zu der satzphonetischen Grundrelation K ⟶ P (min.). Er bestätigt gleichzeitig die Relation. Solche Bestätigungen finde ich in den mir bekannten Sprachen in Fülle. Dürfen wir annehmen, daß es sich bei unserer Grundrelation um ein phonologisches Gesetz von allgemeiner Gültigkeit handelt? Ich vermute es. Die Grenzen meiner Sprachkenntnisse erlauben mir jedoch nicht, hier das letzte Wort zu sprechen. Die Kritik möge aus der Erfahrung mit anderen, speziell nichteuropäischen Sprachen ihr Urteil hinzufügen. Fürs erste können wir also die universale Geltung der satzphonetischen Grundrelation K ⟶ P (min.) nur annehmen, nicht behaupten[2]. Jedenfalls dürfte aber die Versuchung, relationale Gesetze dieses Typus mit den alten Lautgesetzen der Junggrammatiker zu verwechseln, nicht sehr groß sein.

Die *Vokale* sind bislang nicht berücksichtigt worden. Das hat seinen guten Grund; denn die satzphonetische Grundrelation K ⟶ P (min.) betrifft die Konsonanten, nicht die Vokale. Nicht daß die Vokale der Relation K ⟶ P (min.) widersprächen. Aber sie bestätigen sie in einer so selbstverständlichen Weise, daß fast alle Ableitungen, die die Vokale betreffen, trivial sind. Es liegt nämlich im Wesen des Kontrastprinzips begründet, daß die Vokale nur höchst selten irgendwelchen Stellungsbeschränkungen in der Umgebung von K und P unterworfen sind. Einiges mag jedoch von Interesse sein. Im Französischen finden wir keine Langvokale vor K *(lŭtte, pĭquer)*. (Die im heutigen Französisch schwankenden Oppositionen *ẹ:ę* und *ạ:ą* kann ich hier nicht berücksichtigen. Das Schwanken gilt jedenfalls ebenso für die Stellung vor P wie die Stellung vor K.) Entsprechend finden wir auch keine Langvokale vor P *(assidŭ, finĭ)*. Langvokale kommen aber natürlich auch nicht vor Vokal vor, d. h. sie kommen im Französischen überhaupt nicht vor – darin liegt die Trivialität. Das magere Ergebnis bei den Vokalen darf jedoch nicht verwundern. Denn die Vokale müssen, wenn die Rede gegliedert sein soll, möglichst mit Konsonanten alternieren. Es ist daher unwahrscheinlich, weil dem Kontrastprinzip zuwiderlaufend, daß sie ausgerechnet vor oder nach Konsonant Stellungsbeschränkungen unterworfen sein sollten. Im übrigen haben auch die Vokale natürlich ihre Stellungsbeschränkungen in den Sprachen. Diese betreffen aber gerade die Stellung vor und nach Vokal (Hiat, Diphthonge), sind also für unsere Fragestellung unter dem Aspekt der konsonantenartigen Sprechpause unerheblich.

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[1] Vgl. die Überlegungen bei *Holger Sten*, Manuel de phonétique française, S. 109 f.

[2] Vgl. *R. Jakobson* (mit *Grammont*): "A law requiring amendment is more useful than the absence of a law." (Proc. 8th Int. Congr. of Linguists, Oslo 1958, S. 21.)

Die Beobachtung, daß Vokale ihre Stellungsbeschränkungen fast ausschließlich in vokalischer Umgebung, Konsonanten hingegen vornehmlich in konsonantischer Umgebung (einschließlich der Sprechpause) haben, verschafft uns wiederum einige Einsichten in das Kontrastprinzip der Sprache. Durch diese Stellungsbeschränkungen wird ja verhindert, daß sich in der Lautfolge die Vokale oder die Konsonanten über Gebühr ballen. Wir können das Kontrastprinzip nun so formulieren: Es sollen in der Sprache Vokal und Konsonant möglichst miteinander alternieren. Oder (da Vokal und Konsonant nur graduell gegeneinander abgrenzbar und definierbar sind): die Lautfolge soll möglichst große Kontraste aufweisen. Dadurch soll die sprachliche Kommunikation möglichst deutlich und damit möglichst wenig anfällig gegen Störungen (noise) in der Übermittlung sein. Bis zu einem gewissen Grade und je nach den Sprachen in verschiedenem Maße sind Vokal- oder Konsonantenhäufungen gestattet, zumal solche Häufungen gleichzeitig bestimmte Funktionen, beispielsweise als Grenzsignale, wahrnehmen können, darüber hinaus aber sind Häufungen ausgeschlossen. Die Grenzsignale (die eine eigene Untersuchung verdienen) bestätigen übrigens unsere Überlegungen. Grenzsignale sind in den meisten Fällen ein Plus an Konsonanz (vgl. dt. *Kunstverstand*, mit der Konsonantengruppe *–nstf–*, die im Inlaut sonst nicht üblich ist). Dieses Plus an Konsonanz (hier *f* nach *nst*) wird vom phonologischen Bewußtsein als Grenzsignal gewertet, weil es in einer Stellung auftritt, die sonst P vorbehalten ist (absoluter Auslaut: *Kunst*/P). Die Grenzsignale als Plus an Konsonanz setzen also die Relation K ⟶ P (min.) voraus. Im übrigen müssen die Grenzverhältnisse für jede Sprache gesondert untersucht werden.

Für das Französische fällt diese Untersuchung mit dem Problem des sog. *Drei-Konsonanten-Gesetzes* zusammen. Wann sind im Französischen drei (oder mehr) Konsonanten kombinierbar? Es steht außer Frage, daß dieses Problem nur satzphonetisch gelöst werden kann. Ich habe seinerzeit, ausgehend von gemeinromanischen Verhältnissen, einen Lösungsversuch gemacht und folgende Fassung des Gesetzes vorgeschlagen: Es sind im Französischen solche Dreiergruppen möglich, deren zwei letzte Konsonanten im absoluten Anlaut stehen können. Das gilt sinngemäß auch für Vierergruppen: sie sind möglich, sofern ihre drei letzten Konsonanten im absoluten Anlaut stehen können (*pas de scrupules* mit *–dskr–*, weil P/*scrupule*)[1]. In einer ausführlichen kritischen Stellungnahme[2] hat *Kurt Baldinger* darauf aufmerksam gemacht, daß diese Fassung des Gesetzes nicht allen vorkommenden Fällen Rechnung trägt. Eine kleine Auswahl seiner Gegenbeispiele: *reste couché (-stk–)*, *porte-manteau (–rtm–)*, *tourne le bouton (–rnl–)*, *arc de triomphe (–rkd–)*, *arc-boutant (–rkb–)*. *Baldingers* Kritik war berechtigt. Die angeführten Beispiele widersprechen tatsächlich der von mir vorgeschlagenen Fassung des Drei-Konsonanten-Gesetzes. Die Kritik war nun für mich ein Anlaß, das Problem noch einmal zu überdenken und die Fassung des Gesetzes so zu modifizieren, daß es auch der verbleibenden Restkategorie Rechnung trägt. Mir scheint, das ist nun von einer Phonologie der Sprechpause her möglich. Die oben angeführte Fassung des Gesetzes war nämlich unter dem Gesichtspunkt der Sprechpause inkonsequent. Der phonologisch gleiche Status von P und K war zwar gesehen, aber nur aus dem Blickwinkel des Anlauts.

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[1] Vf., Phonologische Studien zur romanischen Sprachgeschichte, Kap. XI.

[2] Zeitschrift für romanische Philologie 74, S. 440–480, besonders S. 471 ff.

Es fehlte jedoch die Kehrseite, und ich muß heute hinzufügen, daß P und K auch unter dem Gesichtspunkt des Auslauts den gleichen phonologischen Status haben. Daraus ergibt sich zwanglos die folgende Erweiterung des Drei-Konsonanten-Gesetzes: Es sind im Französischen Dreiergruppen möglich, sofern ihre letzten beiden Konsonanten im absoluten Anlaut (alte Fassung) oder ihre ersten beiden Konsonanten im absoluten Auslaut (Erweiterung) möglich sind[1]. Der Grund ist einfach: K ⟶ P (min.); Konsonantenkombinationen, die vor P möglich sind, müssen erst recht vor K möglich sein. Alle von *Baldinger* angeführten Beispiele fügen sich dem Drei-Konsonanten-Gesetz in der erweiterten Fassung. Aber es sind auch in dieser erweiterten Fassung keineswegs beliebige drei Konsonanten zu einer Dreiergruppe kombinierbar: die Konsonanten in *bec-de-lièvre* z. B. können nicht zu der Dreiergruppe *–kdl–* zusammentreten, weil weder *–kd* vor P noch *dl–* nach P möglich ist. Mir scheint, daß das französische Drei-Konsonanten-Gesetz in einer besonders eindrucksvollen Weise die Relation K ⟶ P (min.) bestätigt.

Ich muß der Formel K ⟶ P (min.) jedoch zum Abschluß noch eine Art Gebrauchsanweisung mitgeben. Sie ergibt sich daraus, daß die Relation, wie schon erwähnt, asymmetrisch, folglich nicht umkehrbar ist. Das muß bei allen Ableitungen aus dieser Formel berücksichtigt werden, sonst werden die Ableitungen falsch. Ich gebe ein Beispiel. In dem italienischen Wort *vista* steht *s* vor K. Da nun unsere Relation K ⟶ P (min.) lautet und nicht etwa K = P, darf ich nicht aus dem Wort *vista* folgern, nun sei im Italienischen der Laut *s* auch vor P, also im absoluten Auslaut, möglich. Oder anders herum: wenn ich im Italienischen beobachte, daß der Laut *n* im absoluten Auslaut nicht vorkommt, so darf ich daraus nicht schließen, daß er auch vor K nicht vorkommen wird. Das Wort *cantare* würde diese Folgerung sogleich widerlegen. Falsch sind also prinzipiell alle Ableitungen der folgenden beiden Typen:

1. Wenn vor K, dann auch vor P. Entsprechend: Wenn nach K, dann auch nach P.

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[1] Ich habe in der erwähnten Untersuchung versucht, einigen verbleibenden «Ausnahmen» durch die Bestimmung Rechnung zu tragen, daß jeweils nicht der einzelne Konsonant, sondern seine Klasse zählt (also nicht z. B. *bl*, sondern Muta + Liquida). Diese Einschränkung wird durch die erweiterte Fassung des Drei-Konsonanten-Gesetzes hinfällig.

2. Wenn *nicht* vor P, dann auch *nicht* vor K. Entsprechend: Wenn *nicht* nach P, dann auch *nicht* nach K.

Richtig sind hingegen nur die Ableitungen der folgenden zwei Typen:

1. Wenn vor P, dann auch vor K. Entsprechend: Wenn nach P, dann auch nach K.

2. Wenn *nicht* vor K, dann auch (erst recht!) *nicht* vor P. Entsprechend: Wenn *nicht* nach K, dann auch (erst recht!) *nicht* nach P.

Damit sind die Bedingungen bezeichnet, unter denen die satzphonetische Grundrelation K ⟶ P (min.) Ableitungen hergibt. Unter den Bedingungen negativer Beobachtungen können wir vom Inlaut auf den An- und Auslaut, und unter den Bedingungen positiver Beobachtungen können wir vom An- und Auslaut auf den Inlaut schließen. In beiden Fällen ist es möglich, die Empirie der Sprachbetrachtung zu überschreiten.

Wem das zu wenig ist, der möge darüber hinaus bedenken, daß die Sprechpause die Extremstelle der Konsonantenskala innehat. Daraus ergibt sich, daß die Sprechpause unter allen Konsonanten den stimmlosen Verschlußlauten am meisten verwandt ist. An der alten Bezeichnung der stimmlosen Verschlußlaute als Mutae war also doch mehr Richtiges, als wir bisher wahrhaben wollten. Die Folgerungen, die daraus zu ziehen sind, sollen am Beispiel der italienischen Langkonsonanten erörtert werden. In der Stellung «nach» können wir mühelos ableiten: Langkonsonanten kommen nicht nach K vor, folglich auch nicht nach P (das sog. raddoppiamento iniziale erscheint nur im satzphonetischen Inlaut!). In der Stellung «vor» haben wir demgegenüber Schwierigkeiten, da Langkonsonanten allerdings vor den meisten Konsonanten nicht vorkommen, vor einigen Konsonanten hingegen wohl, z. B. in dem Wort *quattro* oder vor den sog. Halbvokalen *(treppiede, cazzuola)*. Wir sind also in unseren Folgerungen blockiert; da wir nicht feststellen können «nicht vor K», können wir auch nicht folgern «nicht vor P». Trotzdem wissen wir, daß Langkonsonanten im Italienischen nicht im absoluten Auslaut auftreten. Das hängt damit zusammen, daß die Sprechpause mit ihrem Status als vokalfernster Konsonant mit den vokalähnlichen Konsonanten (die, wie *r* und die Halbvokale, mit den Vokalen die beiden Merkmale Stimmton und Dauer gemeinsam haben) nur sehr entfernt verwandt ist. Unter diesen Umständen können wir damit rechnen, daß die eingeschränkte Feststellung «nicht vor vokalfernen Konsonanten» bereits zu der Erwartung berechtigt «dann auch nicht vor P». Das ist aber keine strenge Ableitung mehr und kann folglich auch nicht den Charakter eines allgemeinen Lautgesetzes beanspruchen. Ableitungen dieser Art erreichen jedoch eine hochgradige Wahrscheinlichkeit und haben heuristischen Wert.

Zusammenfassung

Unter der Voraussetzung konsequenter Satzphonetik erlaubt die Einbeziehung der Sprechpause in die phonologischen Überlegungen nicht nur, den (absoluten) Anlaut und (absoluten) Auslaut in einem Begriff zusammenzufassen, sondern darüber hinaus, beide mit der allgemeinen Kombinatorik der Konsonanten in Verbindung zu setzen. Die satzphonetische Grundrelation lautet: K ⟶ P (min.) zu lesen: Die Sprechpause ist das Minimum des Konsonantensystems. Oder – pointiert und vereinfacht: die Sprechpause ist der vokalfernste Konsonant. Diese Grundrelation ist vermutlich ein allgemeines Lautgesetz. Damit ist ein Schritt über die Sprachbeobachtung hinaus getan, und wir können mit den folgenden zwei Sätzen operieren: 1. Konsonanten, die vor bzw. nach P möglich sind, sind auch vor bzw. nach K möglich. 2. Konsonanten, die nicht vor bzw. nach K möglich sind, sind auch nicht vor bzw. nach P möglich.

The Phonology of the Pause of Speech

Summary

Phonology, provided it is based on continuous speech and not on the isolated word, can be enriched and simplified by a consideration of the pauses in speech. An examination of the pauses allows not only the synopsis of the initial position and the final position but also enables one to set these two positions in relation to the principles of the combination of consonants in general. We postulate the following fundamental relationship: K ⟶ P (min.), to read: the pause is the minimum of the system of consonants or – to push the relationship to a fiction – the pause is the consonant furthest removed from the vowels. This fundamental relationship is probably a general phonetic law. It marks a step beyond linguistic observation and authorises us to work with two corollaries: 1. The consonants which are possible before or after P (pause) are possible also before or after K (consonant). 2. The consonants which are not possible before or after K are not possible before or after P.

Phonologie des pauses dans le discours

Résumé

La phonologie, pourvu qu'elle soit basée sur la chaîne parlée et non sur le mot isolé, peut être enrichie et simplifiée par des considérations sur les pauses dans le discours. L'examen des pauses permet non seulement la synopse de la position initiale (absolue) et de la position finale (absolue), mais il invite aussi à mettre ces deux positions en

relation avec les principes de combinaison des consonnes en général. Nous constatons la relation fondamentale suivante: K ⟶ P (min.), à lire: la pause est le minimum du système des consonnes, ou bien – en poussant la relation jusqu'à la fiction: la pause est la consonne la plus éloignée des voyelles. Cette relation fondamentale est probablement une loi phonétique générale. Elle marque un pas au-delà de l'observation empirique et nous autorise à opérer avec deux corollaires: 1° Les consonnes qui sont possibles avant ou après P (pause), sont aussi possibles avant ou après K (consonne). 2° Les consonnes qui ne sont pas possibles avant ou après K, ne sont pas non plus possibles avant ou après P. La «loi des trois consonnes» du français peut être conçue comme dérivant de cette relation.

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The Duration of some Norwegian Speech Sounds

By Knut Fintoft

Introduction

Duration is perhaps one of the phenomena in phonetics which has been most frequently investigated by researchers in the subject. Studies of the most languages have been made in this connection, earlier with the kymograph by *Meyer* (1903, 1904), *Selmer* (1920, 1930, 1950), *Einarsson* (1927), *Zwirner* (1938), and many others, and later with sonagraph or level recorder by, among others, *Joos* (1948), *House and Fairbanks* (1953), *Denes* (1955), *Fry* (1955), *Peterson and Lehiste* (1960) and *Eli Fischer-Jørgensen* (1955).

In Norway a number of quantitative length measurements have been undertaken, primarily by *Selmer*, but many of the old experiments are incomplete, with unsatisfactory statistics. It is difficult to draw any conclusions from them, since the uncertainty of the object of measurement has been neglected. Moreover, an attempt has been made to cover too much ground in the experiments. As a first step, it is necessary to concentrate on single relation, and then build further on the basis of these experiments. The purpose of this investigation is to study the relation between "long" and "short" speech sounds, both vowels and consonants, and to examine the effect which the vowel and consonant sounds have on each other. In Norwegian we have a number of words of the form

–VC	or	V:C	*spis!*	(eat!)
–VCC	or	VC:	*spiss*	(tip)

–VCV	or	V:CV	*spise*	(eat)
–VCCV	or	VC:V	*spisse*	(point)

It is of interest to inquire if there is any essential difference between the duration of C: and C, or if it is variation in the duration of the vowel that causes the consonant to be heard as long or short. It is well known that there is an essential difference between the duration of V: and V. Whether one regards V: and V (C: and C) as the same phoneme or not is of no importance in this connection.

The length of a syllable is determined both by the vowel and the following consonant. In most languages described in phonetic literature the quantitative relations are very simple. In Norwegian a "short" consonant follows a "long" vowel, and a "short" vowel is followed by a "long" consonant or a group of consonants. At the same time, the length of the syllables depends on the stress. In Norwegian every stressed syllable is regarded as "long". "Long" consonants are expressed orthographically by a double letter. *Broch and Selmer* (1945) say, with regard to the distinction "long" and "short", that according to measurements in various languages it must be considered, as a rule, that there is no definite duration ratio, but only a general distinction between "longer" and "shorter". The ratios vary from one language to another, and in the individual languages themselves no fixed relation in duration measurement can be indicated.

It must be understood that in these respects the words "long" and "short" are used in two different meanings. An obvious method is to let "long" and "short" refer to duration measurement, and this is tacitly done by some. But in phonetics and linguistics "long" and "short" sound is a matter for definition, and can be expressed in the manner suggested by *Broch and Selmer:* "The distinction between long and short is thus in reality a distinction between sounds which according to the tradition of the language 'allow themselves to be extended' and sounds which 'do not allow themselves to be extended'." But seen in this way there is hardly any point in measuring the duration of speech sounds. According to *Broch and Selmer* it remains a matter for definition, on purely auditive grounds, whether a sound shall be classified as "short" or "long". Some researchers, among them *Selmer*, have found that in a number of instances a "long" vowel can be shorter than a "short" vowel. On the other hand, *Crandall* (1929) has found that there is a tendency to short duration among the "short" vowels and a tendency to longer duration among the "long" vowels.

To avoid these difficulties, the concepts longer and shorter will be used for the present to designate measurements of time. Where it is the natural course to introduce the phonemic concepts these will be signified as "long" and "short".

Test-Words

In this investigation, a number of constructed, disconnected words were used. In natural speech the phonemes are influenced by many factors and the situation is very complicated. At first one has to limit the problems and only examine speech sounds where the influence may be controlled. The drawback in using disconnected words depends on what is to be investigated. However, it is justifiable when the words are constructed in accordance with the rules of the language and may be characterized as structurally possible but accidentally non-existent words in the language. The main problem was to investigate "long" and "short" speech sounds, and for that purpose the list should be suitable.

The test-words were chosen in the following manner:

VCV VCCV CVC CVCC
where V is a, i or u,
and C is f, s, v, m, n, l or r.

The test-words begin and end with the same phoneme, which will give 84 combination possibilities. Combinations of these consonants and vowels resulted in a mixed list of words and nonsense syllables.

The test-words of the types

CVC and CVCC
where C is f, v, m or n

were reduced to

VC and VCC

because it was suspected that the words were to difficult to pronounce. The following were thereby chosen as test-words:

afa	asa	ava	ama	ana	ala	ara
affa	assa	avva	amma	anna	alla	arra

ifi	isi	ivi	imi	ini	ili	iri
iffi	issi	ivvi	immi	inni	illi	irri
ufu	usu	uvu	umu	unu	ulu	uru
uffu	ussu	uvvu	ummu	unnu	ullu	urru

sas	sass	sis	siss	sus	suss
lal	lall	lil	lill	lul	lull
rar	rarr	rir	rirr	rur	rurr

af	aff	if	iff	uf	uff
av	avv	iv	ivv	uv	uvv
am	amm	im	imm	um	umm
an	ann	in	inn	un	unn

With a word-list prepared in this systematic manner the persons taking part in the experiment were indirectly compelled to make a difference between "long" and "short" consonants, although meaningless syllables were used.

In Norwegian it is comparatively rare that short monosyllables occur without a consonant at the beginning or at the end. It is also more usual to find a single consonant than a combination of consonants both at the beginning and the end of these words. Some 54% of Norwegian monosyllables are of the type with one consonant at the beginning and one at the end (*Vogt* [1940]).

The test-words were read without prefixed sentences or syllables in order to avoid complications in the test material. *House and Fairbanks* (1953) decided to prefix each word by an unstressed syllable (hu-), to select orthographic forms that would yield least meaning. *Meyer* generally used a monosyllabic prefix before the test-words (dæ). *Selmer* nearly always used /o/, but he has suggested that one should use white noise before test-words.

The Test Persons

The test persons, 8 male students about 25 years old, were selected with a dialect from Eastern Norway (Oslo). None of them had any speech disorders. Before actual recordings were made, each person was given a short training during which he read aloud the test-words. Instructions pertaining to vocal behaviour were kept to a minimum. No attempt was made to regulate the duration or the intensity. But they were asked to read each word separately and were simply instructed to pronounce the words as if talking to the experimenter.

Some of the test-words were read without any distinctive difference between "long" and "short" consonants. In some cases it was impossible to discern any difference. These syllables were therefore not analysed. Some of the test-words written with a single consonant were pronounced with a "long" consonant. This applied to the syllables:

lal, lil, lul, am, an, iv, im, in, uf, uv, um and un.

These recordings are treated as if the test-words were

lall, lill, lull, etc.

Some of the last test-words with double consonants (uff, uvv, umm) were pronounced with an extraordinary "long" consonant by two of the persons taking part in the experiment. These recordings were not analysed.

Nearly all the disyllables were pronounced with "tone l"*. The test-words which were not pronounced with "tone l", were not analysed. Altogether around 40 test-words were omitted from the test material.

Technique

The records were made on a Tandberg Stereo tape recorder at a recording speed of 7½" per sec in an acoustic "dead" room. *Black* (1950) mentions that phrases were read more slowly in large rooms that in small ones, and among the large rooms, the rate was slower in live than in dead rooms. The results in this study relate to records in a small room with a rather short reverberation time.

The measurements of duration are easily carried out by means of a Kay Electric Sonagraph. To carry out the spectral analysis, it is necessary to use a number of band-pass filters. The filter of bandwidth 300 c/s was used and therefore it was difficult to get a proper response for a rapid change of wave form that occured in a time less than $^1/_{300}$ sec. The analysis covered the range 0–8 kc/s, and the instrument recorded 2.4 sec in 318 mm.

The identification of the beginning and end of a sound surrounded by others is an arbitrary act that is both difficult and artificial.

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* "Tone l" is one of the two Norwegian word accents (cf. bønder-bønner).

It is impossible to fix these points, there is always a gradual transition from one sound to another. The uncertainty of the object is therefore greater than the uncertainty of the measuring method. Location of these points are dependent on the degree of clarity with which they appear in the sonagrams. Therefore, the noise level had to be a minimum. The symmetrical structure of the test-words greatly simplified the identification of the vowels and consonants.

Results

This investigation has been made of the duration of the vowels and consonants when they occur in analogous positions, and the duration of the consonants with regard to their manner of formation and place of articulation. The ratio of the duration between "long" and "short" sounds and between voiced and unvoiced consonants has been examined. In order to compare the duration of the sounds with other experiments an analysis of the speaker rate was undertaken.

The duration of the vowels and consonants will be described below on the basis of their position in the test-words.

Initial vowels occur in this experiment in words of the types VCV, VCCV, VC and VCC. Within the uncertainty area (two times the standard deviation from the mean value) no difference is found between the duration of the vowels *a*, *i*, and *u* in analogous test-words, with the exception of vowels before *v*. Then the duration of *a* is greater than that of *i* and *u*. It is noted that there is agreement between the duration of the vowels before *v*, *m* and *n* in mono- and dissyllables, but the agreement is somewhat less before *f:*. An examination of the duration of the vowels without regard to the influence of the following consonant on the duration reveals that there is no difference between the mean values. On the other hand, there is an essential difference between the duration of vowels followed by "short" and "long" consonants. The average duration of vowels before "short" consonants is about 200 ms, as against about 100 ms in the case of vowels before "long" consonants. The ratio between the average duration of vowels before "short" and "long" consonants is around. 1.9. The duration of vowels, however, depends to a great extent on the following consonant. There is agreement in the duration of vowels when they are followed by liquids, and the same uniformity is noticed before nasals and the unvoiced fricatives. But the duration of vowels before voiced is longer than before unvoiced fricatives. Thus, the duration of vowels can be tabulated according to the manner of formation of the consonants that follow (table I). The dependence is most marked when the consonant is "short" and there is no difference, inside the uncertainty, between the average duration of the vowels when they are followed by *f:*, *s:*, *m:*, *n:*, *l:* and *r:*. Table II shows the ratio between the durations of vowels before "short" and "long" consonants.

Table I

Average duration of vowels as a function of the following consonant (for final vowels; as a function of the preceding consonant). The standard deviation of the mean is added.

	Duration in ms			
	Initial		Medial	Final
	a	i, u		
f	195±5			123±5
s			212±6	
v	248±7	213±7		131±7
m	182±5			128±3
n				
l	213±7		179±6	132±6
r				105±6
f:	101±3			113±4
s:			112±4	
v:	125±4			129±4
m:	107±3			129±5
n:				
l:	101±4		129±4	125±5
r:				116±5

Medial vowels are only investigated in test-words of the types CVC and CVCC where C = s, l and r. In analogous test-words, inside the uncertainty range, there is no difference between the duration of the vowels, except in the case of *a* before *r* and *l:*. In both cases the duration of *a* is greater than that of *i* and *u*. The average duration of the vowels, without regard to the neighbouring consonants, is the same when the vowels precede "short" consonants. On the other hand, it seems as if the duration of *a* before "long" consonants is somewhat greater than that of *i* and *u*. The material of *Eli Fischer-Jørgensen* (1955) appears to indicate the same phenomenon. Medially, the duration of vowels before "short" consonants is essentially longer than before "long" consonants. The average

Table II

The ratio between the average duration of vowels preceding "short" and "long" consonants as a function of the consonants. The uncertainty is about 0.1.

	Initial		Medial
	a	i, u	
f	1.9		1.9
s			
v	1.9	1.7	
m	1.7		
n			
l	2.1		1.4
r			

ratio is 1.6, i.e., somewhat less than when the vowels are initial sounds. *Eli Fischer-Jørgensen* gives the corresponding ratio as equal to 2, *Meyer* (1904) gives 1.6 for Danish and 2 for German, *Selmer* (1930) gives about 1.8, and from *Einarsson*'s material it is seen that the average ratio is 1.9.

The duration of medial vowels is also dependent on the following consonant (table I). There is no evidence of a difference if the vowel is followed by *r* or *l*. This is in agreement with *Peterson and Lehiste* (1960). But both *Einarsson* (1927) and *Belasco* (1953) find that the duration of the vowel before *r* is longer than before *l*. *Belasco* says that the duration of the vowels appears to vary inversely with the degree of physiological energy required to pronounce the consonants.

It might be thought that the consonants before the vowels could affect the duration of the vowels. Since the test-words with medial vowels are symmetrical, these cannot be compared. Some degree of control may be applied by comparing the pairs: sas – af, sass – aff, etc. There is agreement between the duration of the vowel in these pairs, and it is, therefore, hardly likely that the consonants preceding the vowels have any effect on their duration. *Eli Fischer-Jørgensen* suggests that /h/ preceding a vowel hardly has any effect on the duration of the vowel. It is not possible to make a corresponding comparison when the vowels occur together with liquids. But if one compares the duration of medial vowels before liquids in monosyllables with the duration of vowels as initial sounds before liquids in disyllables only 50% agreement is found.

The average ratio between the duration of the vowels before "short" and "long" fricatives is 1.9, the same as in initial sound. On the other hand, there is a wide difference between the ratios when the vowels are before initial and medial liquids. The average ratio between the duration of the vowels preceding "short" and "long" medial liquids is 1.4. *Peterson and Lehiste* report that the ratio of the durations of "long" syllable nucleus and "short" syllable nucleus is about 1.3–1.4 for both fricatives and liquids.

Final consonants are examined in test-words of the types CVC, CVCC, VC, and VCC. It is impossible to show any difference between the duration of the consonants on the basis of the vowels (*a*, *i*, *u*). Agreement is found between the duration of final fricatives in all types of test-words. Initial consonants can thus hardly have any effect on the duration of final consonants.

There is also agreement between the durations of the nasals, but this is not the case with the liquids (table III). The duration of the unvoiced fricatives is essentially longer than that of all other consonants. Further, the duration of "long" consonants is somewhat longer than that of "short" consonants (table IV). Within the uncertainty area the ratio is the same for all consonants, viz., 1.1–1.2. In *Selmer*'s material we find a ratio between the durations n:/n and s:/s equal to 1.1 and 1.3, and in *Einarsson*'s material the ratios r:/r and n:/n are equal to 1.4.

Medial consonants occur in the test-words of the types VCV and VCCV, where C = f, s, v, m, n, l and r. No difference can be

Table III

Average duration of consonants. The standard deviation of the mean is added.

		Duration in ms	
	Initial	Medial	Final
f		178±4	250±7
s	173±5		
v		105±7	147±6
m		131±4	158±5
n			
l	95±4	122±5	136±7
r	117±6	144±4	105±6
f:		217±5	282±5
s:			
v:		145±5	174±6
m:		169±6	174±5
n:			
l:		164±6	156±5
r:		193±7	124±7

Table IV

Ratios between the average duration of "long" and "short" consonants. The uncertainty of the ratios is added.

	Medial	Final
f:/f	1.22 ± 0.04	1.13 ± 0.04
s:/s		
v:/v	1.38 ± 0.11	1.18 ± 0.06
m:/m	1.29 ± 0.06	1.10 ± 0.05
n:/n		
l:/l	1.35 ± 0.08	1.15 ± 0.08
r:/r	1.34 ± 0.06	1.18 ± 0.14

demonstrated between the duration of the consonants owing to the vowels. There is agreement between the duration of the unvoiced fricatives and the nasals. However, the duration of *r* after *i* and *u* is greater than that of *l*. *Einarsson* finds that *l:* is longer than *r:*. The duration of the unvoiced fricatives is longer than that of the other consonants (table III). Moreover, the duration of the voiced fricative in this experiment is essentially shorter than that of the unvoiced in accordance with *Einarssons*'s findings. The duration of "long" consonants is in all cases somewhat longer than the duration of "short" consonants. Inside the uncertainty area the ratio between the duration of "long" and "short" consonants is, generally speaking, the same, between 1.2 and 1.4.

Initial consonants. The duration of *s*, *l* and *r* only is examined in initial sound of test-words of the types CVC and CVCC. It seems as if the duration of the consonants is independent of the vowels that follow, and there is agreement, moreover, between the duration of the initial consonants in the two types of test-words. The average duration of the fricative, however, is essentially longer than that of the liquids (table III).

Final vowels. The duration of *a*, *i* and *u* has been studied after *f*, *s*, *v*, *m*, *n*, *l* and *r* in test-words of the types VCV and VCCV. Inside the uncertainty area there is no difference in duration. Agreement is found between the duration of the vowels when they follow unvoiced fricatives and nasals. On the contrary, the vowels appear to be longer after *l* than after *r* (table I). Within the uncertainty area there is no difference between the duration of the vowels when they come after "short" and "long" consonants. The average duration of the final vowels is 125 ms.

Voiced and unvoiced consonants. In this test we have an example of the voiced and unvoiced version of the same articulation (*f* – *v*). The duration of these sounds and the duration of their neighbouring vowels are examined.

In test-words of the types VC and VCC the duration of unvoiced fricatives is longer than that of voiced ones. At the same time, the duration of the preceding vowel will change. In test-words of the types VCV and VCCV there is analogous relation (table V and fig. 1). The ratio between the average duration of voiced and unvoiced consonants is the same when the consonants are final and medial. The average ratio is around 0.6. The final vowels do not change the duration of the consonants, since the ratio between the duration of consonant and vowel-consonant ($\frac{C}{VC}$ and $\frac{CC}{VCC}$) is the same in the two types of test-words.

Table V

The average ratios between voiced and unvoiced fricatives.
The uncertainty of the ratios is added.

	Test syllables	
	VC–VCC	VCV-VCCV
v/f	0.62 ± 0.04	0.61 ± 0.03
v:/f:	0.64 ± 0.03	0.67 ± 0.05
v/Vv	0.38 ± 0.03	0.33 ± 0.03
f/Vf	0.53 ± 0.03	0.49 ± 0.03
v:/Vv:	0.57 ± 0.03	0.55 ± 0.04
f:/Vf:	0.71 ± 0.03	0.71 ± 0.03

Denes (1955) has investigated the relative duration of vowels and final consonants in the voiced and unvoiced version of the same articulation. He reports that the duration of the unvoiced consonants varied from 200–380 ms, and the voiced from 100–180 ms, thus giving a ratio of about 0.5.

The vowels tend to be shorter before unvoiced consonants than before voiced consonants. The ratio is about 0.8. The same effect is found in other languages. *Zimmerman and Sapon* (1958) report that the mean difference is 18.2 ms in Spanish. *House and Fairbanks* (1953) report that there is a statistically significant difference of 79 ms between the two means, the ratio is about 0.7. *Denes* has found a difference of about 83 ms. A greater difference is found by *Peterson*

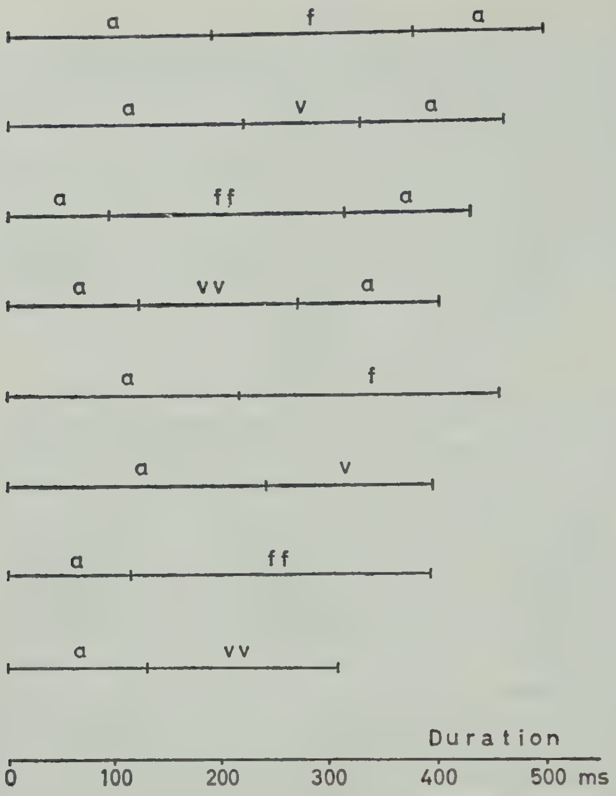

Fig. 1. Average duration of vowels and consonants in analogous test-words with voiced and unvoiced fricatives. Double consonants indicate "long" consonants, and "a" stands for the average duration of the vowels *a, i* and *u.*

and Lehiste (1960); the average duration of the syllable nucleus before voiceless consonant was 197 ms and before voiced consonant 297 ms. Thus the ratio was approximately 2:3. *Meyer* (1904) has found a little smaller effect in German. The ratio was around 0.9.

The unvoiced consonant forms more of the syllables than the analogous voiced consonant. The ratio between the duration of consonant and that of vowel-consonant is greater when the consonant is unvoiced. In the syllables VCV and VCCV the "long" unvoiced consonant constitutes about one-half of the syllable, while the "short" voiced consonant only constitutes about one-quarter. Both "short" unvoiced and "long" voiced consonants form more than a third of the syllables, whereas the vowels before "short" unvoiced consonants are somewhat longer than before "long" voic-

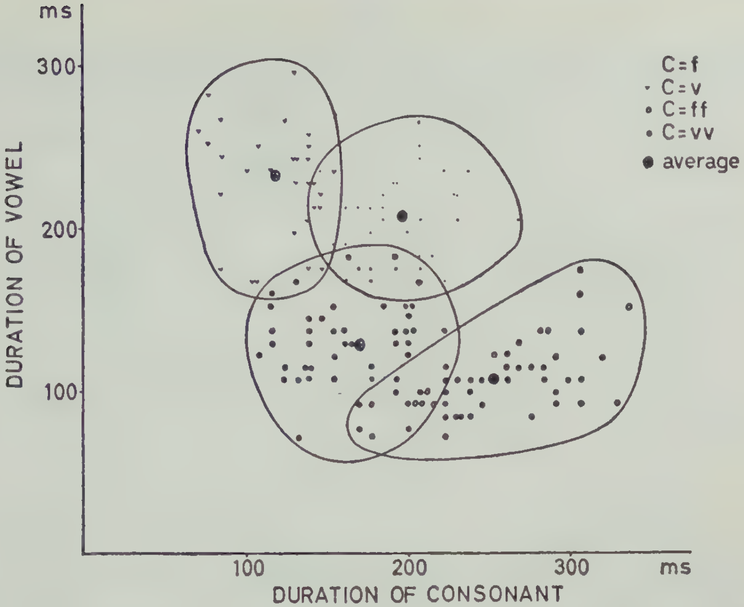

Fig. 2. Duration of vowel preceding consonant as a function of the duration of the consonant. The consonants are the voiced and unvoiced version of the same articulation (*v*–*f*). Double consonants indicate "long" consonants and at the same time a "short" vowel.

ed consonants. Fig. 2 shows the duration of the vowel preceding consonant as a function of the duration of the consonant.

The effect of the place of articulation. It has been established that the duration of the vowels is dependent on the manner of formation of the consonant following, and that the duration of the consonants depends on their manner of formation. An analogous investigation can be made to discover whether the place of articulation has any effect on the duration of the vowels or the consonants.

The duration of the initial vowels seems to be longer before "short" labio-dentals and alveolars than before the bilabial (table VI). There is no difference between the duration of vowels before "short" labio-dentals and "short" alveolars; but the duration is greater before "long" labio-dentals than before "long" alveolars. The duration of final vowels after "short" alveolars is shorter than after bilabial. The duration of the vowels after "long" consonants appears to be independent of their place of articulation.

Investigation has been carried out in respect of the duration of only three initial consonants. It has been found that the durations

Table VI

Average duration of vowels as a function of the place of articulation of the following consonant. (For final vowels; as a function of the preceding consonant.) The standard deviation of the mean is added.

	Duration in ms Initial	Medial	Final
"Short" labial	182 ± 7		139 ± 5
"Short" labiodental	215 ± 5		125 ± 5
"Short" alveolar	205 ± 6	183 ± 7	120 ± 5
"Long" labial	106 ± 3		130 ± 7
"Long" labiodental	114 ± 3		121 ± 4
"Long" alveolar	100 ± 4	126 ± 4	119 ± 4

of these stand in the following order

$$s > r > l$$

It is not possible, therefore, to demonstrate that the place of articulation has any effect on the duration of the consonants. Nor is it possible, inside the uncertainty area, to point to any difference between the medial consonants on the basis of their place of articulation (table VII). The duration of the final unvoiced fricatives is essentially longer than the duration of the other final consonants. It would, therefore, be unwise to attempt a comparison of labiodentals and alveolars.

Table VII

Average duration of medial consonants as a function of their place of articulation. The standard deviation of the mean is added.

	Duration in ms "Short" consonants	"Long" consonants
Labial	139 ± 7	168 ± 11
Labiodental	142 ± 7	187 ± 5
Alveolar	147 ± 4	188 ± 4

Einarsson (1927) found that the further forward the place of articulation, the longer the consonant. *Meyer* (1904) and others have found that the duration of the vowel is directly related to the size of the mouth opening and inversely related to tongue height. Neither of these effects was observed in the present experiment.

Duration of syllables. The duration of disyllables can be divided into two groups, VCV and VCCV. Monosyllables must be more

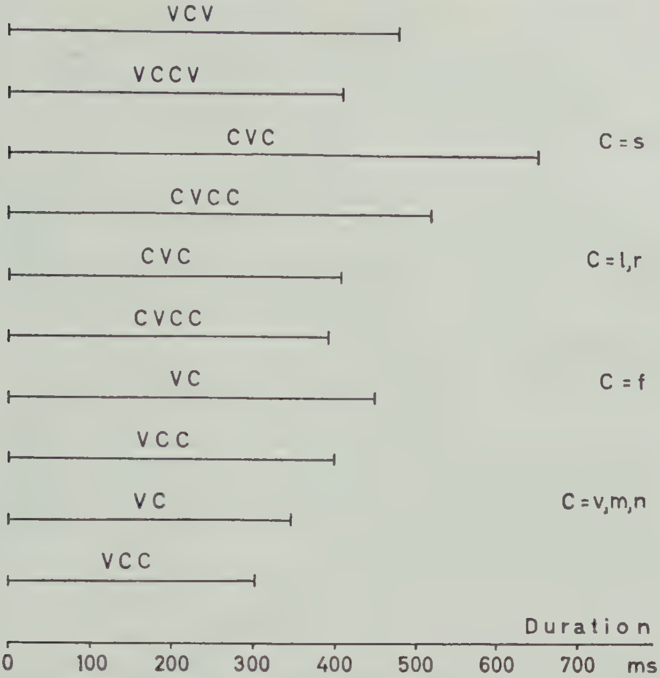

Fig. 3. Average duration of test syllables. V stands for the average duration of the vowels *a*, *i* and *u*.

freely divided, not only into the groups CVC, CVCC, VC and VCC. In the first two groups there is agreement when C = l and r, but the syllables where C = s are substantially longer. This is mainly because the duration of both initial and final *s* is essentially longer than that of *l* and *r*. In the groups VC and VCC there is general agreement when C = v, m and n, whereas the syllables where C = f are essentially longer. This is due to the duration of *f* being considerably longer than the duration of *v*, *m* and *n*. The duration of the syllables is presented in fig. 3. In all cases, apart from syllables of the types CVC and CVCC where C = l and r, the average duration of the syllables with "short" consonants are longer than the corresponding ones with "long" consonants. In the exceptional cases inside the uncertainty area, there is no difference between the duration of the syllables with "short" and "long" consonants. That the duration of the syllables with "short" consonants is usually greater than those with "long" consonants is mainly due to the fact that the vowels before "short" consonants are 1.5–2

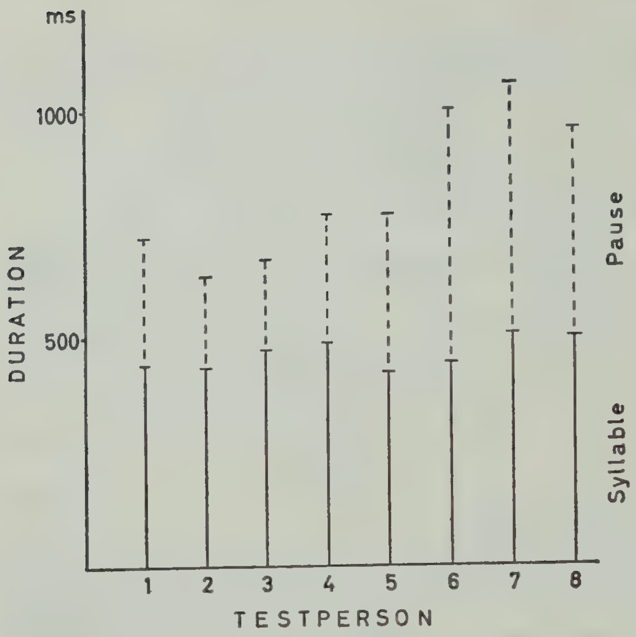

Fig. 4. Average duration of the test-words of the types VCV and VCCV and the average duration of the pauses between successive words.

times longer than the vowels before "long" consonants, whereas "long" consonants are only 1.1–1.2 times longer than "short" consonants. The duration of the vowels is thus of greater importance to the duration of the syllables than is the duration of the consonants. The ratio between the duration of the syllables with "short" and "long" consonants is 1.1–1.2, except in cases of CVC – CVCC where C = l and r.

In *Selmer*'s material (1930) it is found that the average duration of syllables of the type CVC is 790 ms, of the type CVCC 730 ms, of the type CVCV 740 ms, and of the type CVCCV 710 ms. Thus it seems as if syllables with "short" consonants are longer than syllables with "long" consonants. The duration of the syllables, however, is considerably longer than in this experiment. *Miller and Licklider* (1950) reported that the duration of speech sounds in monosyllabic words used in an articulation test was somewhat longer than would be obtained for conversational speech. The average word lasted about 0.6 sec, corresponding to only 100 words per min. (No time allowed for pauses between the words.) The duration of the test-words of *Peterson and Lehiste* (1960) (CVC) was about 700 ms. Conversational rate average is around 130 words per min. The average duration of monosyllables is thus < 460 ms. The average duration of all the test-words in this experiment is 415 ms.

Speaker rate. There are several different ways in which speaker rate might be defined. Usually it is defined as the inverse of the time required to read a given number of words, thus including the duration of both words and pauses. The duration of the syllables VCV and VCCV and the intervals between successive test-words was measured. The results are given in fig. 4 where the average duration of the syllables and pauses for each test person are plotted. There are relatively great differences between the various speaker rates. Three persons spoke discernibly slower than the others. On the other hand, there are less differences between the duration of the syllables. The ratio between the duration of the syllables and the pauses is not constant, but vary between 0.8–2.4. Therefore, it seems as if the differences of speaker rates are of no importance to the duration of the syllables.

Conclusion

There does not seem to be any basic difference between the duration of the vowels *a*, *i* and *u*. Only in a certain few words is the duration of initial and final *a* greater than the duration of *i* and *u* in analogous compounds. The average duration of the vowels is the same.

The duration of the vowels is markedly dependent on the following consonant, but seems to be almost independent of the preceding consonant. It seems as if the duration of the vowels is only dependent on the immediately adjacent sounds. The duration of the vowels before "short" consonants is substantially longer than before "long" consonants. In unvoiced fricatives the ratio is 1.9 with initial and medial vowels. In the case of liquids the ratio is 2.1 with initial vowels but only 1.4 with medial vowels. The duration of the vowels is shorter before unvoiced than voiced consonants (fricatives). The ratio is 0.8. The duration of initial and medial vowels before "short" consonants is of the same order, about 200 ms (fig. 5). The duration of the final vowels is of the same order as the duration of the initial and medial vowels, preceding "long" con-

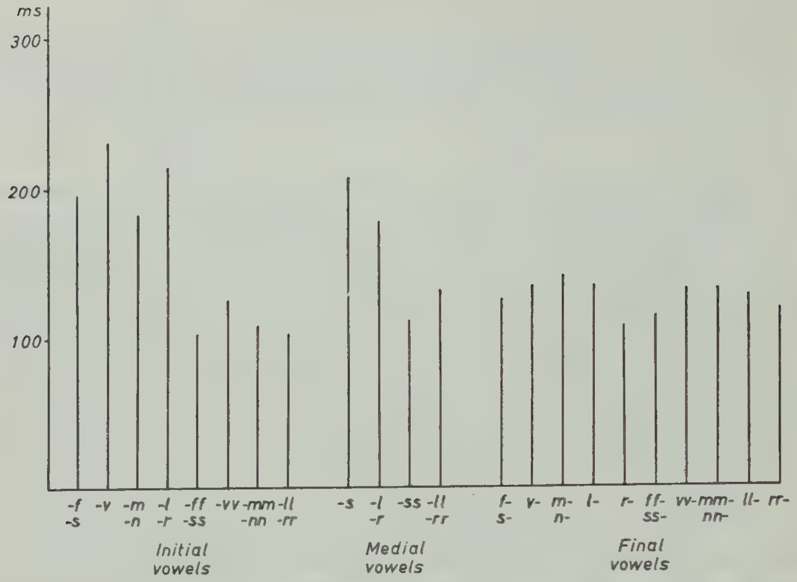

Fig. 5. Average duration of initial, medial and final vowels as a function of the neighbouring consonant.

sonants, about 120 ms. It seems as if the duration of the vowels is decided more by the manner of formation of the following consonant than by the place of articulation of the consonant.

The duration of the consonants appears to be independent of the adjacent vowels (*a*, *i* and *u*), and of the place of articulation of the consonant, but dependent on the manner of formation (fig. 6). Agreement between the unvoiced fricatives and the nasals is noted. However, the duration of initial and medial *r* is greater than that of *l*. In final sound the reserve applies. This is perhaps because it is easier to "roll the r" in initial and medial sound than in final. The duration of the consonants, apart from the liquids, is greater in final sound than medially. With the liquids, generally speaking, it is the opposite. The duration of initials *s* and *l* is usually shorter than finally. But there is no difference between the duration of initial and final *r*. In initial sound as well as in medial and in final sound, the unvoiced fricatives are longer (sometimes markedly longer) than the other consonants.

In initial sound and medially the ranking of the duration of the consonants is:

$$s\ (f) > r > m\ (n) \geqq l > v,$$

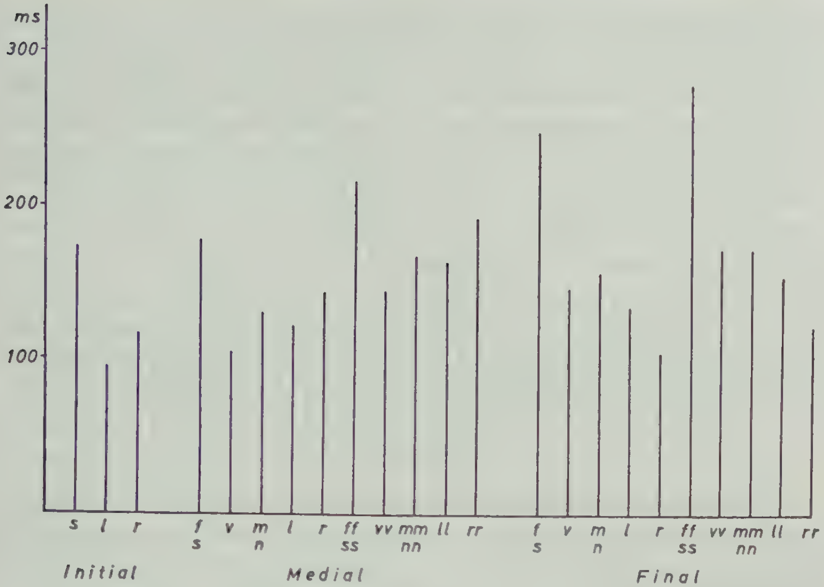

Fig. 6. Average duration of initial, medial and final consonants.

whereas in final sound

$$s\ (f) > m(n) = v \geqq l > r.$$

In all the cases investigated the ratio between "long" and "short" final consonants is 1.1–1.2, whereas the corresponding ratio in the case of medial consonants is 1.2–1.4. That is to say there is a somewhat greater difference between "short" and "long" medial consonants than final consonants. The ratio increases in the same manner in respect of all the consonants. By and large there is a greater difference between "long" and "short" vowels than between "long" and "short" consonants. This agrees with the findings of *Einarsson* (1927). The duration of unvoiced consonants is longer than that of the analogous voiced consonants. The average ratio is the same when the consonants are final and medial, about 2:3.

It is possible that the duration of the consonant, in Norwegian too, is an indication whether it is to be interpreted as voiced or unvoiced. The duration of the vowel preceding the consonants appears to be decisive for the subjective interpretation of the duration of the consonants ("long" or "short"). In the syllables VC where C = v the duration of the vowels is usually double that of the consonants. In the syllables VCC where C = f the opposite is the case: the duration of the consonants is around double that of the vowels. In the syllables VC where C = f the duration of the vowels and the consonants is about the same. It seems to be immaterial whether the duration of the consonant or the vowel is longer. In the syllables VCC where C = v there is a wholly analogous relation, but the duration of both the vowels and the consonants is shorter. It is found that the duration of syllables with "long" vowels is greater than that of syllables with "short" vowels. The speaker rate does not seem to have any special effect on the duration of the syllables.

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Summary

Using a sonagraph an investigation has been made of the duration of some vowels and consonants in East Norwegian. The vowels are significantly affected by the manner of formation of the following consonant. The duration of the consonants seems to be independent of the neighbouring vowels. The duration of the vowels is shorter before a voiceless consonant than before a voiced, and the duration of the unvoiced consonants is longer than the voiced version of the same articulation. It seems as if the duration of the consonants, in Norwegian too, is a clue for "voicing", whereas the duration of the vowels is of vital importance for the interpretation of "short" and "long" consonants.

Die Dauer norwegischer Laute

Zusammenfassung

Die Dauer einiger Vokale und Konsonanten der ostnorwegischen Sprache ist mittels eines Sonagraphen untersucht worden. Es wurde gefunden, daß die Aussprache der Vokale von der Bildungsart des nachfolgenden Konsonanten beeinflußt wird. Die Dauer der Konsonanten scheint von den Nachbarvokalen unabhängig zu sein. Die Dauer der Vokale ist kürzer vor einem stimmlosen Konsonanten als vor einem stimmhaften, und die Dauer der stimmlosen Konsonanten ist länger als jene der analogen stimmhaften. Es scheint, als ob die Dauer der Konsonanten im Norwegischen ein Zeichen für stimmlos – stimmhaft ist, während die Dauer der Vokale eine große Bedeutung für die Interpretierung der «kurzen» und «langen» Konsonanten hat.

La durée de quelques sons norvégiens

Résumé

Se servant d'un sonagraph on a fait une investigation de la durée de quelques voyelles et de quelques consonnes du norvégien de l'est. Les voyelles sont sensiblement

influées par la manière de la formation de la consonne suivante. La durée des consonnes semble être indépendante des voyelles voisines. La durée des voyelles est plus courte devant une consonne sourde que devant une consonne sonore, et la durée des consonnes sourdes est plus longue que la version sonore de la même articulation. Il semble que la sonorité des consonnes, en norvégien aussi, soit d'importance décisive de la durée, tandis que la durée des voyelles soit d'une importance vitale pour l'interprétation des «courtes» et des «longues» consonnes.

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The Native Languages of America: A Survey of Recent Studies

By Irvine Davis

In any expanding field of study the point is soon reached when it becomes impossible for the scholar to acquaint himself firsthand with the latest contributions outside of his own narrow limits of specialization. In the field of structural linguistics, which has only quite recently emerged as a somewhat autonomous discipline, there is already a need for abstracts, review articles and other devices which enable one to absorb with a minimum of effort the general content of recently published materials. In the area of American Indian linguistics alone, the rapidly increasing volume of literature makes it impossible within the limits of a relatively brief review article such as this to include for consideration anything but the more important contributions. The most that can be expected from the present article is that it will help to acquaint the reader with recent trends in the field of American linguistics and with some of the significant published materials of the last decade.

For those desiring to undertake more detailed studies of native American languages there is available a wealth of sources. The principal publications are indicated in the list prefixed to the bibliography of this article. The bibliography itself will give the reader a cross section of current literature, including a number of review articles of more restricted focus[20, 81, 128, 152]. More complete listings of current titles may be found in the *Bibliographie Linguistique* issued annually by the Permanent International Committee of Linguists, in the *Quarterly Checklist of Linguistics* published by the American Bibliographic Service, and in regular issues of the *International Journal of American Linguistics* and the *Journal de la Société des Américanistes* of Paris.

Specific language families or geographical areas have been the subjects of numerous specialized bibliographies. Some of these are noted in the present paper, while *Gibson*'s bibliography of anthropological bibliographies[49] gives a more exhaustive listing.

Dockstader's bibliography of theses and dissertations[31] lists many unpublished manuscripts of American linguistic studies. This type of material, however, is excluded from consideration in the survey to follow.

Trends

Modern structural linguistics in America grew out of the renaissance in anthropological activity lead by *Franz Boas* at the turn of the century, and it reached maturity under *Leonard Bloomfield*, *Edward Sapir* and the imposing number of Sapir-trained students who followed. While the influence from Europe is not to be discounted, American linguistics of the Boas-Bloomfield-Sapir tradition has pursued a somewhat independent course and is characterized at the present by certain emphases which are the result of its peculiar genesis and growth. In reaction to the tendency to force exotic languages into the mold of the classical European languages, it has stressed the empirical study of each language on its own merits. It has focused attention on the spoken rather than the written language and has emphasized the analysis of text material obtained from native speakers of the language. It has maintained the necessity of an adequate description of individual languages as a prerequisite to comparative and theoretical formulations. It has, since the days of *Bloomfield* and *Sapir*, stressed linguistic structure and has attempted to describe the structure of phonological and of grammatical systems. It has from the beginning been closely linked to American anthropology. As a consequence it has been vitally concerned both with historical reconstructions and with the relationship between language and other aspects of culture.

The emphasis in this paper on structural linguistics is not intended to minimize other approaches to the study of New World languages and literature. Etymological studies, the literary analyses of written documents and studies of folklore each have their own value, but must remain at the periphery of the present survey.

The analysis of written records has in the past had only a small place in American structural linguistic studies. While many Latin American centers of learning have specialized in philological studies of native materials, North American linguists have concentrated their efforts on recording as much as possible of the rapidly disappearing spoken languages. Recent years, however, have seen an increased interest in structural analyses based on data obtained, not from native informants, but from archived records of the past. *Broadbent*[19] discusses methods used in reconstituting the phonological structure of an extinct language known only through fragmentary written materials. Others, including *Shell*[164] and *Kroeber and Grace*[93], have produced structural studies based on more complete secondhand data.

The past decade has seen little innovation in phonological theory and methodology as applied to American Indian languages. With few exceptions, phonological descriptions have followed closely the type of phonemic statement that has characterized American linguistics of the last quarter of a century. There has, nevertheless, been an increasing concern with extending the analysis beyond a mere description of phonemes. Distinctive feature analysis, developed by *Jakobson* and his co-workers, focuses attention on the acoustical components of a phonological system and has been incorporated in *Taylor*'s description of Island Carib phonemics[176] as well as *Keller and Saporta*'s study of Chontal consonant clusters[90]. The application of another type of componential analysis is illustrated by *Yegerlehner*'s analysis of Arizona Tewa phonemes[192]. Other recent studies have carried phonological analysis beyond phoneme and syllable structure to more inclusive units[52, 116].

The American linguist has, in general, been little concerned with exact phonetic descriptions. Traditionally his source of data has been a living informant and his only equipment a note-book and pencil (and, more recently, a magnetic tape recorder). He has relied on auditory and, at times, visual clues to phonetic distinctions and has made little use of mechanical aids to linguistic analysis. This fact is reflected in the paucity of studies involving the instrumental analysis of the speech sounds of American Indian languages. The one outstanding example of this type of study in recent years is *Hickerson*'s thorough spectographic analysis of *Shawnee*[70]. Other investigators[137, 167] have shown that instrumental phonetics can be an aid in traditional structural analysis, especially in regard to problems of pitch, and recourse to instruments will no doubt play a larger role in future linguistic work.

Among American linguists there has been much less uniformity in the treatment of grammatical materials than there has of phonological data. In addition to the previous methods of grammatical analysis, two fresh approaches have gained considerable attention during the last decade. Transform grammar, developed by *Zellig Harris* and his students, seeks to describe the grammatical structure of a language in terms of a limited number of kernal constructions together with a set of transformations, which applied to the kernal constructions, are capable of yielding all constructions permitted by the language. Although transform grammar has made a considerable impact in linguistic theory, it has yet to be applied extensively to native American languages. A paper by *Gudschinsky*[54], however, illustrates its application in this field.

A somewhat different approach, originally termed "grammemics" but now "tagmemics", is a product of *Kenneth Pike* and others of the Summer Institute of Linguistics. The tagmeme, in *Pike*'s view, is a basic unit of grammar comparable to the phoneme in the phonological structure and the morpheme in the lexical hierarchy, and is characterized by the correlation between a functional slot and a distributional class of morphemes or morpheme sequences. A number of papers on American languages have utilized *Pike*'s approach[66, 115, 122, 163].

The study of semantics, which formerly was excluded by many as being outside of the scope of structural linguistics, is now receiving increasing attention. Perhaps the most fruitful approach to semantics as applied to native American languages has been a type of componential analysis. This method is illustrated by *Wonderly*'s description of Quechua person markers[189] and has more recently formed the basis of a fresh approach to analyses of kinship terminological systems, of which *Lounsbury*'s Pawnee study is an outstanding example[105]. A different type of treatment is employed in *Garvin*'s detailed analysis of the semantic range of the obviative in Kutenai[46].

Comparative and historical studies continue to be of prime interest to many American linguists. The tracing of linguistic relationships has followed closely the less exciting task of descriptive work and has been an important tool in the reconstruction of New World cultural history. The question of what constitutes proof of genetic relationship between languages with little or no written history is obviously a relevant one, especially in light of the tendency of many writers to arrive at premature conclusions on the basis of a few striking similarities. The controversy concerning whether or not morphological features diffuse from one language to another and whether morphological similarity is a valid criterion for demonstrating genetic relationship has continued through the past decade only slightly abated[84, 94]. While the weight of opinion at the present apparently favors regular phonetic correspondences as the only reliable proof of genetic relationship, *Hymes*[82] has shown how the positional distribution of grammatical categories might, in some cases, provide a different sort of basis for historical reconstructions.

An important development in comparative studies of the past ten years has been the use of lexicostatistics or glottochronology. It is claimed that it is possible to calculate the time that has elapsed since two languages have diverged from a common ancestor by determining the percentage of cognates among basic lexical items.

While the attempt to quantify lexical resemblances is laudable, many linguists feel that the technique fails to give reliable time depths. The subject is reviewed in a recent article by *Hymes*[81] in a much more thorough manner than could be attempted here.

The specific comparative and historical studies to be cited later in this paper illustrate a number of types of treatment. The problem of determining the interrelationships within a linguistic stock or a group of closely related languages and dialects often precedes more detailed reconstructions. Lexicostatistics, apart from implications of time depth, has proven to be a useful tool for this purpose[97]. Perhaps a more reliable method from the viewpoint of genetic relationships, but one involving more tedious analysis, is based on the tracing of shared phonological features[120]. Another technique, applicable to groups of languages and dialects within which there is some degree of mutual intelligibility, involves testing the extent to which a speaker of one language or dialect understands the recorded speech from another[69]. The sometimes disparate results obtained by different methods have been examined in certain recent studies[53, 135].

Many comparative studies attempt to reconstruct features which presumably characterized the ancestral language. These reconstructions may involve a selected lexical item[59]; or the entire phonemic structure together with an extensive vocabulary may be reconstructed[187]; or grammatical features may be included as well[55]. Reconstructions are sometimes based, not on comparative data, but on features of the distribution of phonemes and allophones within a single language. The techniques of internal reconstruction are discussed in a paper by *Chafe* and illustrated by Seneca material[25].

There has in recent years been a renewned interest in the comparison of languages on the basis of structural similarities apart from implications of genetic relationship. *Voegelin*[183] has suggested procedures for the comparison of phonemic systems and has tentatively applied them to certain American Indian languages. *Milewski*[123], in a more ambitious undertaking, has classified native American languages into a few broad regional groups on the basis of phonological similarities. Related to the problem of phonological typologies is the phenomenon of similarities in sound systems among geographically contiguous, but unrelated languages. *Jacobs*[85] examines this phenomenon in relation to the languages of the Pacific Northwest. Typologies involving features of the grammatical structure have been developed by *Greenberg* and are applied by *Kroeber*[92] to a number of diverse languages including Eskimo.

Stimulated by the earlier writings of *Sapir* and of *Whorf*, interest in the relationship of language to culture has continued to the present. A collection of papers growing out of a conference on the interrelations of language and other aspects of culture has recently been published under the editorship of *Hoijer*[75]. Empirical studies by *Lenneberg* in relation to Zuni color terms[100] and by *McClay* in relation to the classification of material objects by Navajo speakers[117] have explored the validity of the so-called Whorfian hypothesis.

The problem of linguistic acculturation in relation to acculturation in general has received considerable attention in recent studies. *Casagrande*[22], in a series of articles, examines the changes in the Comanche language resulting from a long period of contact with European culture and draws some theoretical conclusions regarding linguistic change as part of culture change as a whole. *Dozier*[32] contrasts the processes of linguistic innovations in two American tribes, the Yaqui and the Tewa.

Survey by Region and Linguistic Family

Approached from the viewpoint of genetic relationships, the study of native American languages constitutes a distinct field. With the exception of an Eskimo dialect which is spoken in the eastern extremity of Siberia, no aboriginal American language or generally recognized language family extends beyond the borders of the New World. None of the purported linguistic relationships between American languages and those of other parts of the world which are described from time to time in pseudo-scientific literature, and occasionally in reputable journals, is regarded by American linguists as demonstrated. Some linguists, however, retain hope that with more evidence and with refined techniques of comparison, relationships of this sort may yet be established. Perhaps the most promising possibility lies in a comparison of Athabascan with Sino-Tibetan, for which *Shafer* has assembled considerable data[162].

In the New World itself there is a rather distinct cleavage between the languages of North America and those of South America. Central America constitutes an intermediate zone, in which some languages are related to those of North America, while others are related to those of South America. If one accepts the most recent broad classification of Central American languages[175], a division may be made between the Azteco-Tanoan, Penutian, Hokan-Siouan and Macro-Oto-Manguean languages on the one hand and the Macro-Chibchan and Ge-Pano-Carib languages with their South American affinities on the other hand. While details of this classification are highly tentative, the present survey will follow the division between North and South American languages that is suggested. The languages of the West Indies, now practically extinct except for the transplanted Black Carib enclave in Central America, are clearly linked to South America. Possible genetic relationships between the languages of North America and those of South America (e.g., the suggested Hokan-Siouan affinity of Yurumangui in Colombia) are extremely remote, if valid at all.

North America

Classifications of the North American languages are based largely on two pioneering efforts, one by *Powell* in the late nineteenth century and the other by *Sapir* at a later date. The former classification was conservative in nature and postulated a large number of language families on the basis of obvious lexical resemblances. The latter drastically reduced the number of families by making sweeping inclusions on the basis of vague structural similarities. Recently published classifications have taken into consideration subsequent comparative work and have ignored the artificial boundary between the languages of Mexico and those of the United States, but have, in general, followed the lead of either *Powell* or of *Sapir*. The classification recently prepared by *Driver* and others[33] is conservative in its approach, listing 72 families for North and Central America and the Greater Antilles. *Sapir*'s classification, on the other hand, has been followed with a few modifications by *Trager and Harben*[179], who recognize seven language phyla for North America.

Any realistic grouping of the languages of North America must distinguish those relationships which are based on undisputed evidence from those that rest on tenuous evidence or which are mere guesses. The latest classification, that of *Lamb*[96], attempts to take this into consideration. The resulting picture is one of a number of widespread linguistic groupings of undisputed validity, plus numerous small families and individual languages of doubtful affinities.

The Eskimo-Aleut, or Eskimoan, language family extends along the northern perimeter of the continent from Greenland in the east to the Bering Sea in the west. Some Eskimo dialects, particularly those of Greenland, have been quite thoroughly described. The work of Scandinavian scholars in this field continues, with the appearance in the last ten years of *Bergsland*'s description of the West Greenland dialect[13] and *Holtved*'s Polar Eskimo studies[80]. *Swadesh*'s comparative work[174] has helped to clarify the interrelationships of the Eskimo dialects, while the long-recognized relationship between Eskimo and Aleut has been more firmly demonstrated through the studies of *Marsh and Swadesh*[112] and of *Bergsland*[11]. Added to sporadic studies of Aleut is *Bergsland*'s recent compilation of proper names and text material[12].

Algonquian tribes formerly occupied most of eastern Canada south of the Eskimos, as well as large areas of northeastern and northcentral United States and portions of the Great Plains. Many of the Algonquian languages are still spoken today and have been the subject of intensive linguistic investigation. Recent additions to the already impressive literature on Central Algonquian include a posthumous publication of *Bloomfield*'s work on eastern Ojibwa[14] and a Menomini grammar by *Gachet*[45]. Comparative studies by *Hockett*[73] and by *Miller*[124] have supplemented *Bloomfield*'s earlier Proto Central Algonquian reconstructions. Studies in other branches of the

Algonquian family continue to lag behind those of the central languages, although *Salzmann*'s description of Arapaho[154] has helped to fill the gap.

Considerable progress has been made, especially as a result of the studies of *Haas*, in relating Algonquian to other North American linguistic groups. The controversial relationship to the Ritwan languages of California has been clarified[56], and evidence has been presented for a previously unsuspected relationship, that with the Gulf languages to the south[57]. At the same time, evidence confirming *Sapir*'s Algonquian-Mosan relationship has not been forthcoming.

The delineation of the Gulf languages as a linguistic entity embracing the Muskhogean languages together with other languages of southeastern United States in based largely on the work of *Haas*[58]. Descriptive material for these languages published in the last ten years has been meager except for *Haas*'s Tunica texts and dictionary[60].

The Iroquoian languages constitute another important group in eastern North America and have until recently been almost neglected by descriptive linguists. The appearance of *Reyburn*'s Cherokee analysis[143], *Lounsbury*'s description of Oneida verb morphology[104], and Seneca materials by *Chafe*[26] and by *Holmer*[79] has added greatly to our knowledge of these languages. Comparative studies, except for *Hickerson*'s classification of Iroquois languages and dialects[69], are almost completely lacking. The purported relationship of Iroquoian to Caddoan, as well as their inclusion in Hokan-Siouan has at the present not been demonstrated.

The Caddoan languages, spoken in scattered portions of central United States, remain poorly described. Recent comparative studies are lacking and descriptive material is confined to *Garvin*'s phonemic analysis of Wichita[48].

Siouan tribes formerly occupied most of the Missouri Valley and adjacent territory, as well as a portion of the Atlantic seaboard. Large Siouan-speaking communities still exist in the Great Plains area and considerable linguistic work has been done there. *Robinett*'s Hidatsa studies[148] and *Wolff*'s Osage material[188] are welcome additions to the descriptive literature, while *Wolff*'s comparative work[187] sheds light on internal relationships within the Siouan stock. Also published in recent years is a volume of Crow texts collected by the late *R. H. Lowie*[109]. External relationships remain in doubt, and even the supposedly close relationship between Siouan and Yuchi, an unclassified language of southeastern United States, is as yet undocumented.

The Athabascan language family includes numerous tribes scattered over a large area of northwestern Canada and interior Alaska, as well as a few isolated groups southward along the Pacific coast and the flourishing Apachean groups of the Southwest. The northern and the Pacific Athabascan languages are poorly represented in recent literature. The completion of *Haile*'s Navajo dictionary[61] and *Reichard*'s grammar[142] add to the already numerous studies of the Apachean languages. The internal relationships of the Athabascan languages are outlined in *Hoijer*'s lexicostatistic study[74], while *Landar*[97] has helped to clarify the subgroupings of some of the northern Athabascans.

New descriptive material is lacking for Tlingit, Haida and Eyak. The validity of a Na-Dene stock including these languages plus Athabascan remains in doubt, although *Hymes*'s work on the positional analysis of categories[82] represents a new type of approach to the problem.

Along the Pacific coast from British Columbia to southern California the linguistic picture is bewildering. In this area there are languages which belong to at least six major stocks. In addition to the Athabascan languages, there are those classified as Mosan, Ritwan, Penutian, Hokan, and Uto-Aztecan, as well as some of doubtful classification.

Mosan, which includes the Wakashan, Salish and Chimakuan languages, covers most of the British Columbia coast and the Puget Sound area, and extends inland through the Columbia River drainage. The Salish languages have been the subject of detailed comparative studies by *Swadesh*[173] and by *Reichard*[141], while the validity of the Mosan stock is supported by further studies of *Swadesh*[170]. Recently published descriptive material includes *Tweddell*'s analysis of a Puget Sound Salish language[181] and *Sapir*'s Nootka texts[156], a continuation of previously published material.

The Ritwan languages of northern California have been shown to be remotely related to Algonquian[56], and are represented in recent descriptive studies by *Robins*'s excellent monograph on the Yurok language[149].

Penutian, a name originally coined by *Dixon* and *Kroeber* to refer to a group of californian languages, has gradually been extended to include languages from Canada to Mexico. Although the Penutian problem has been examined recently in papers by *Swadesh*[172] and by *Hymes*[83], no one is at the present in a position to say exactly how many languages should be admitted as being Penutian.

The history of California Penutian language studies has been ably reviewed by *Callaghan*[20], while *Pitkin and Shipley*[139] have assembled considerable evidence in support of the linguistic unity of these languages. Descriptive studies include *Freeland*'s Sierra Miwok material[42, 43] and *Shipley*'s phonemic analysis of Maidu[165]. Some progress has been made in relating other languages to California Penutian. Evidence is presented by *Shipley*[166] for the Penutian affinity of Yuki, a Californian language previously classified as Hokan-Siouan. Data gathered by *Sapir* and edited by *Swadesh*[155] show the relationship of some Oregon languages to Penutian. New descriptive studies of Oregon Penutian and of other supposedly Penutian languages of the Northwest, including Tsimshian and the Sahaptian languages, are meager. Among the few contributions are two volumes of Chinook texts collected by *Jacobs*[86].

The Mixe-Zoque and Mayan languages, as well as Totonac and Huave, have been classified by some as Penutian, while others would include Uto-Aztecan in a Macro-Penutian phylum. These languages are reserved for later consideration.

The Hokan languages have a status comparable to that of Penutian. Originally applied to a small group of Californian languages, the term has been extended to include languages elsewhere. A Hokan-Siouan stock proposed by *Sapir* includes languages scattered from southern Canada to South America and from the Pacific to the Atlantic. While many linguists doubt the validity of such an all-inclusive grouping, there is accumulating evidence that the Hokan-Coahuiltecan or Hokaltecan subgroup constitutes a real linguistic entity. *Bright*[17] has made glottochronologic counts of these languages and *Haas*[59] has reconstructed the Proto-Hokan-Coahuiltecan word for water. Other comparative studies include *Jacobsen*'s comparison of Washo and Karok[87] and *Greenberg and Swadesh*'s Jicaque study[51], which lists a number of cognate sets as evidence of that language's Hokan affinity. A bibliography by *Bright*[16] covers Hokan-Coahuiltecan studies through 1954. Recent descriptive material includes *Bright*'s monograph on the Karok language[18], *Olmsted*'s phonemic analysis of Shasta[130], and *Sapir and Swadesh*'s Yana dictionary[157].

Before turning to a consideration of the widespread Uto-Aztecan languages, a word should be said concerning the general linguistic picture in the Plateau, Great Basin and Southwestern areas of western North America. The Plateau area in the north is represented, in addition to the previously mentioned Sahaptian and Salish languages, by an unclassified language, Kutenai. The publication of a series of Kutenai texts[47] has supplemented *Garvin*'s previous descriptive studies. The Basin area to the south is occupied by scattered groups speaking closely related Uto-Aztecan languages. Still farther south in Arizona and New Mexico there is an intermingling of a number of linguistic stocks. In addition to the Athabascan and Uto-Aztecan languages, there are those belonging to the Yuman and the Tanoan families, as well as two languages, Zuni and Keres, of undetermined genetic relationships. The status of linguistic research in the Southwest is reviewed in a recent paper by *Newman*[128]. Descriptive material of recent date includes, for the Tanoan languages, *Yegerlehner*'s analysis of Arizona Tewa[192] and some additional Taos studies by *Trager*[178]. For Zuni there is a well-organized dictionary by *Newman*[129], but very little has been published in the last decade for Keres or the Yuman languages. While the relationship of Yuman to Hokan and of the Tanoan languages to Kiowa and to Uto-Aztecan has been recognized by many American linguists, there remains a need for detailed comparative studies demonstrating these relationships. In the meantime, a number of descriptive studies of Kiowa have been published, including *Sivertsen*'s analysis of pitch[167] and *Merrifield*'s description of verb prefixes[122].

Although *Hale*'s lexicostatistic data[62] shed some light on the problem, the internal divisions of the Uto-Aztecan stock are rather obscure and much remains to be done in tracing the historic phonology of these languages. The languages of the Great Basin together with Comanche constitute a close-knit linguistic entity. A classification of the languages and dialects of this group has been undertaken by *Lamb*[95], while *Canonge*'s Comanche texts[21] provide a welcome addition to published linguistic material.

Studies relating to the scattered Uto-Aztecan languages in southern California, the Southwest and northern Mexico include *Seiler*'s Cahuilla studies[161], *Kroeber and Grace*'s Luiseño grammar[93], *Voegelin*'s study of Hopi dialects in relation to the problem of phonemic analysis[184], *Fraenkel*'s phonemic statement of Yaqui[41], *Hilton*'s Tarahumara dictionary[72] and *Bascom*'s analysis of Tepehuan tone phenomena[9]. *McMahon*'s Cora dictionary[119] and *Grimes*'s Huichol material[52] relate to Uto-Aztecan languages farther to the south.

The Aztec, or Nahuatl, languages of southern Mexico are well represented by recently published materials. *Pittman*'s grammar of Tetelcingo Nahuatl[140], together with *Croft*'s series of Matlapa studies[29] and shorter papers by *Law*[99] and by *Key*[91] provide a wealth of grammatical analyses. The Uto-Aztecan languages of Central America remain little known, although a study by *Hasler*[67] shows the relation of Pipil to other Aztec languages.

The Mayan languages of southern Mexico and Central America have long been of particular interest to linguists and anthropologists because of their link with the ancient Middle American civilizations. A grammatical analysis of the Quiche language of the Popol Vuh has been produced by *Friedrich*[44], while studies of contemporary Mayan include *Bowman*'s analysis of Yucatec[15], *Keller*'s description of the phonemes of Chontal[89], *Mayer*'s Pocomchi material[114, 115], *McArthur*'s study of Aguacatec phonology[116] and *Harrington*'s analysis of Valladolid Mayan enumeration[65]. *McQuown*[120] reviews the published classifications of Mayan languages and suggests some revisions based on a study of sound correspondences.

A large group of languages of central and southern Mexico, including the Otomian, Popolocan, Mixtecan and Zapotecan families, as well as the Manguean languages of Central America, have been tentatively included in a Macro-Oto-Manguean stock. *Swadesh*[171], on the basis of glottochronologic counts, proposes a regrouping of these languages to include a Macro-Mixtecan stock composes of most of the Mexican representatives of Oto-Manguean plus the Huave language.

Otomi and the related languages of central Mexico are represented by a number of recent descriptive studies. *Gibson*'s description of Pame phonemics and morphophonemics[50], a study of Eastern Otomi by *Jenkins*[88], an analysis of Mazahua vowel harmony by *Spotts*[168] and *Wallis*'s paper on Mezquital Otomi[185] contribute considerably to the literature on these languages. A comparative study by *Bartholomew*[8] suggests some revisions in *Newman* and *Weitlaner*'s earlier Otomi reconstructions.

Material published on the Zapotecan languages has been less extensive, but includes *Pickett*'s Isthmus Zapotec studies[133, 134], as well as a Chatino phonemic analysis by *McKaughan*[118] and a brief grammatical sketch of the same language by *Upson*[182].

As the result of a number of recent comparative studies, the Mixtecan and Popolocan families now rank among the more thoroughly delineated of the New World linguistic groupings. *Longacre*'s reconstruction of Proto-Mixtecan phonology from a comparison of Mixtec, Cuicatec and Trique[102] is a major contribution to Mexican comparative studies. *Gudschinsky*'s contributions[53, 55] involve a comparison of the Mazatec dialects, a reconstruction of Proto-Popolocan from Popoloc and Mazatec, and a reconstruction involving her Proto-Popolocan and *Longacre*'s Proto-Mixtecan. The term Popotecan has been coined to refer to the stock composed of Popolocan and Mixtecan. Other comparative studies involving these languages include *Fernández de Miranda*'s Proto-Popolocan reconstructions[39], *Mac and Longacre*'s study of Proto-Mixtec phonology[111], and *Holland*'s lexicostatistic study of the Mixtec and Cuicatec dialects[76].

The growing descriptive literature relating to Popotecan languages is also impressive. For the Popolocan family there are Mazatec papers by *Gudschinsky*[54] and by *Pike*[136], and a phonemic analysis of Ixcatec by *Fernández de Miranda*[38]. Mixtecan material includes *Davis and Walker*'s Cuicatec analysis[30], *Dyk*'s Mixtec texts[35], *Hart*'s Amuzgo grammar[66], *Longacre*'s Trique studies[103], and *Mak*'s analysis of Mixtec tonal systems[110].

The possible Penutian affiliation of Mixe-Zoque, Totonac and Huave has been previously mentioned. *Wonderly*[190], however, examines with negative results the evidence for a relationships of Totonac to Mixe-Zoque and to Mayan. The classification of these languages, as well as that of Tarascan and of the so-called Hokan-Siouan languages of Mexico must be considered as still undetermined. New descriptive material for these languages is meager, except for a number of studies involving Mixe-Zoque. The latter language group is represented by *Clark*'s description of Sayula Popoluca phonemes[27], *Wonderly*'s Zoque studies[191], and *Elson*'s Sierra Popoluca morphology[36]. For Totonac there is a study of verb inflection by *Aschmann and Wonderly*[4].

South America

Linguistically South America is, in comparison to North America, a virgin field. The lack of descriptive material led *Rowe*[152] to remark ten years ago that "it is probably true that we know less about more languages in South America than in any other continental area". Although there is at the present an increased activity in the field of South American descriptive linguistics, the situation is only slightly improved.

Comparative work in South America has been confined largely to superficial lexical comparisons and the task of detailed reconstructions has hardly begun. Classification problems in South America have been reviewed by *Rowe*[152], who find the published classifications deficient in many respects. At least two important classifications have appeared since *Rowe*'s review. *McQuown*'s listing of the aboriginal languages of Latin America[121] is based largely on a study of previously published materials. More recently a revolutionary regrouping of the South American languages proposed by *Greenberg* has been incorporated in a number of published classifications, including that of *Tax*[175]. In place of the several dozen families that have been proposed by others, *Greenberg* groups the languages of South America into three phyla, the Macro-Chibchan, the Ge-Pano-Carib and the Andean-Equatorial, plus a small Hokan-Siouan enclave. *Greenberg* has thus attempted for South America what *Sapir* undertook for North America: a drastic reduction in the total number of language families, but with many broad inclusions of a highly tentative nature. Years of detailed comparative research will be required to either substantiate or reject many details of *Greenberg*'s new classification.

Because of the uncertain nature of many proposed linguistic groupings and because of the scattered distribution of certain large language families, the present survey of linguistic research in South America will proceed largely on the basis of geographical areas rather than linguistic affiliations.

The vast tropical lowland region, extending from the Caribbean through the Orinoco and Amazon basins to southern Brazil and Paraguay, is inhabited by hundreds of small aboriginal groups speaking an amazingly diversified medley of languages and dialects. Included in this area are a number of widespread language families, such as the Chibchan, Arawak, Carib, Ge and Tupi-Guarani, which have long been recognized by linguists, as well as numerous languages and small language groups of uncertain classification.

The Chibchan languages of Central America remain poorly described. Recent contributions are confined to *Alphonse*'s Guaymi grammar and dictionary[3] and text material supplementing *Holmer*'s earlier Cuna studies[78]. Elsewhere in the Caribbean area, the prolific writings of *Taylor* provide an abundance of material on

Island Carib, including descriptive[176] as well as comparative[177] studies. In Venezuela there has appeared some material on the Guarao language of the Orinoco delta, including a dictionary by *Barral*[7] and a brief grammatical study by *Osborn*[131]. There is also an analysis of Macoita phonology by *Hildebrandt*[71] and some Makiritare material by *Escoriaza*[37]. For the languages of Colombia there are a number of good analyses published recently by *Caudmont*[23, 24], as well as a description of Motilone phonemes by *Hanes*[63] and a study of Spanish loanwords in Waunana by *Loewen*[101].

In the eastern lowland areas of Ecuador and Peru considerable linguistic research has been effected by the Summer Institute of Linguistics, as well as by the late *Paul Rivet* and his co-workers. Studies involving the Arawak languages of this area include *Duff*'s analysis of Amuesha syntax[34], *Wise*'s study of the phonology of the same language[186], *Matteson*'s Piro material[113], *Pike and Kindberg*'s phonemic analysis of Campa[138], and *Rivet and Wavrin*'s Resígaro data[147]. The Witotoan languages are represented by *Minor*'s analysis of Witoto vowels[125] and Ocaina studies by *Agnew and Pike*[1] and by *Rivet and Wavrin*[146]. Other languages of this area are covered in *Peeke*'s Andoa material[132], *Cox*'s analysis of Candoshi verb inflection[28], *Shell*'s Cashibo studies[163], *Turner*'s Jivaro paper[180], and a phonemic analysis of Huambisa by *Beasley and Pike*[10]. For the Bolivian lowland area there is a Chama phonemic analysis by *Firestone*[40] and *Schermair*'s Sirionó dictionary[158].

In Brazil, except for Tupi-Guarani studies, the literature is meager. There is some Waiwai material by *Hawkins*[68], but little else on the numerous Carib languages. Ge studies are represented by *Shell*'s reworking of Quain's Kraho material[164] and by a comparison by *Baldus*[6] of Cherente and other Ge lexical items. *Loukotka*[106] surveys the known Botocudo materials and makes some cursory lexical comparisons. There is a brief study of Bororo by *Albisetti*[2] and a vocabulary collected by *Schultz*[159] of Umutina, a Bororo dialect.

The Tupi-Guarani languages are spoken by a large segment of the population of Paraguay and adjacent areas, and by scattered tribes in other parts of tropical South America. As the result of the Tupi-Guarani studies at the University of São Paulo and elsewhere, there is now a considerable volume of literature devoted to these languages. Although modern structural studies remain few, there have recently been a number of significant contributions to Tupi-Guarani linguistics. Of special note are the numerous papers by

Rodrigues, including the analysis of a Tupi text[150], and a study of Spanish loanwords in Guarani by *Morínigo*[127]. *Hanke, Swadesh and Rodrigues*[64] describe the phonology of Kanoé, a Tupian language of the Guaporé region. A number of dictionaries have appeared in recent years, including *Ayrosa*'s Portuguese-Tupi compilation[5] and *Schermair*'s previously mentioned Sirionó-Spanish dictionary[158]. Classifications of the Tupi-Guarani languages have been proposed by *Loukotka*[107] and more recently by *Rodrigues*[151].

There are very few recent contributions to the non-Tupi-Guarani languages of Paraguay, or of Argentine and Chile. Studies of these southern languages are confined to a Lengua vocabulary collected by *Lowes*[108], a phonemic analysis of Pehuenche by *Suárez*[169] and *Holmer*'s Yahgan studies[77].

Reserved for final consideration is the Andean highland region of the Quechua and Aymara languages. The term Quechu-Maran is sometimes applied to these apparently related languages which are spoken by the numerically strongest indigenous groups remaining in the New World. Like Tupi-Guarani, these languages have held an important place in philological studies at the universities. The literature, especially that relating to the Quechua languages, is voluminous. A recent bibliography by *Rivet and Créqui-Monfort*[145] fills four volumes and lists several thousand titles relating to Quechua and Aymara. It is only in recent years, however, that structural linguistic studies have begun to appear. Phonemic analyses of Quechua include those of *Rowe*[153] and of *Reyburn*[144], while grammatical studies are represented by *Yokoyama*'s outline of Quechua morphology[193] and by *Wonderly*'s analysis of person morphemes[189]. Additional Quechua material includes *Mora*'s etymological and comparative dictionary[126] and a collection of texts by *Lauriault*[98]. Except for *Sebeok*'s Aymara materials[160], recent studies of significance are lacking for this important Bolivian language.

That published structural studies, particularly grammars, are lacking for a large majority of the hundreds of South American languages is clearly evident. There are indications, however, that the sporadic linguistic investigations of the past are giving way to more systematic efforts. The work of the Summer Institute of Linguistics in Ecuador, Peru, Bolivia and Brazil; the increasing number of other linguistically trained missionaries; the presence of competent linguists such as *Caudmont* in Colombia and *Hildebrandt* in Venezuela; and the growing interest in structural linguistics on the part of some philologists all point to the time in the near future when our knowledge of the structure and of the genetic relationships of South American languages will be rapidly multiplied.

Bibliography

Key to Abbreviations

AA	American Anthropologist.
AL	Anthropological Linguistics.
An	Antropológica (Caracas).
BBAE	Bulletin of the Bureau of American Ethnology.
CA	Current Anthropology.
ICA	Proceedings of the International Congress of Americanists.
IJAL	International Journal of American Linguistics.
IUPAL	Indiana University Publications in Anthropology and Linguistics.
IURCAFL	Publications of the Indiana University Research Center in Anthropology, Folklore, and Linguistics.
JSAP	Journal de la Société des Américanistes (Paris).
LP	Lingua Posnaniensis.
MPR	Miscellanea Paul Rivet, Octogenario Dicata. XXXI Congresso Internacional de Americanistas, Universidad Nacional Autónoma de México.
MSA	Serie de Vocabularios Indigenas Mariano Silva y Aceves, Publicado por el Instituto Linguistico de Verano en Cooperación con la Dirección General de Asuntos Indigenas de la Secretaria de Educación Publica, Mexico, D.F.
RCA	Revista Colombiana de Antropologia.
RMEA	Revista Mexicana de Estudios Antropologicos.
SILUO	Summer Institute of Linguistics of the University of Oklahoma, Linguistic Series.
SJA	Southwestern Journal of Anthropology.
UCPL	University of California Publications in Linguistics.

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Libri

Kita Tschenkéli: **Georgisch-deutsches Wörterbuch.** Faszikel I.a-badrižani. XXXVIII + 58 Seiten. Amirani Verlag, Zürich 1960.

L'auteur de la grammaire du géorgien dont j'ai donné ci-dessus un compte-rendu, vient de faire paraître le premier fascicule d'un dictionnaire géorgien-allemand. Le dictionnaire sera complet avec une dizaine de fascicules de 96 pages chacun, qui, selon l'auteur, paraîtront au rythme de deux par an. Avec plus de mille pages il sera beaucoup plus riche que les dictionnaires en langue européenne, allemand, anglais et russe, que nous possédons déjà.

Dans l'introduction l'auteur expose les principes qu'il a suivis dans la rédaction de son ouvrage. Comme il est toujours difficile de porter un jugement définitif sur un dictionnaire avant qu'il soit complet et avant qu'on l'ait manié pendant un certain temps, c'est surtout à ces principes que je voudrais m'arrêter ici.

Dans la présentation du vocabulaire, tout comme dans la description du système grammatical, c'est la classe des verbes qui fait difficulté. La méthode qu'on a suivie jusqu'ici, celle de donner les verbes d'après leur infinitif, a, dans le cas du géorgien, de grands inconvénients. L'infinitif géorgien n'est pas comparable aux infinitifs des langues indo-européennes. Les formes qu'on appelle infinitifs, n'ont souvent que des rapports assez vagues avec les formes personnelles tirées de la même racine. Des formes *vambob* je dis, *vit'q'vi* je dirai, *vtkvi* je dis (aoriste), *veubnebi* je lui dis, *vet'q'vi* je lui dirai, *vutxari* je lui dis (aoriste) ont à leur côté un certain nombre de noms verbaux, d'action et d'état, mais il est difficile, sinon impossible, d'assigner à l'un entre eux le rôle d'infinitif qui couvre cet ensemble de formes qui constituent le paradigme complet. Le supplétisme qu'on voit apparaître dans les formes citées, est un phénomène très important dans la conjugaison et précisément pour les verbes les plus fréquents, comme ‚être, devenir, faire, aller, venir, boire', etc. Cet état des choses pose pour le lexicographe un certain nombre de problèmes qu'il lui faut résoudre d'une façon ou d'une autre. Sous ce rapport le dictionnaire de *Meckelein* n'est pas satisfaisant. Dans le sens de ‚aller' il donne ainsi les «infinitifs» *slva* et *svla*, *vla*, *areba*, *siaruli* (dont d'ailleurs seul le dernier a une existence réelle en géorgien moderne), mais on n'y trouve pas, semble-t-il, la forme de présent *da-v-di-var* je vais. De même pour ‚faire' on trouve le futur *vizam*, sous *zma*, infinitif qui n'existe pas, l'aoriste *vkeni* sous *kmna* et le présent *všvrebi* d'une façon indirecte (et incorrecte) sous *šroma* travail. On peut concevoir plusieurs méthodes de présentation pour sortir de ces difficultés. La comparaison entre le dictionnaire présent et le grand dictionnaire géorgien-géorgien en cours de publication à Tiflis est assez intéressant à cet égard, comme ils représentent deux méthodes diamétralement opposées. Celui de Tiflis donne tous les verbes sous la forme de la 3e personne du singulier du présent. Comme les catégories les plus diverses (versions, diathèses, absolu et relatif, causatif et simple, aspects) s'expriment par des préfixes (ou préverbes), la méthode choisie entraîne un morcellement à l'infini des formes qui ensemble créent un paradigme complet. Ainsi les différentes formes de *(da)c'era* écrire seront réparties sur au moins vingt articles dispersés dans tous les volumes de l'ouvrage – avec un nombre d'articles à peine inférieur pour chacun des composés verbaux à préverbes. L'auteur du dictionnaire qui nous occupe ici, a choisi la méthode opposée. Celle de grouper toutes les formes personnelles d'une racine verbale dans un seul article, sous la racine. L'article *b(ma)* lier donne une idée de la mise en œuvre de ces principes. C'est un article de 2 pages, qui donnent un aperçu d'ensemble sur toutes les formes personnelles qu'on peut tirer de cette racine. C'est une méthode qui certainement est plus économique et qui, au point de vue théorique, se laisse très bien défendre. Le premier fascicule contient, cependant, très peu d'articles de cette sorte, de sorte qu'il n'est pas facile de se faire une idée très nette de ce que la méthode donnera pour les verbes très riches en formes. Il est possible qu'elle demande un certain effort de la part du lecteur, qui doit isoler la racine verbale d'abord, et ensuite sous la racine verbale parcourir un certain nombre de colonnes pour trouver la forme dont il cherche le sens. Ces difficultés ne doivent pas être exagérées; les articles semblent très bien organisés, la typographie est excellente, avec un emploi judicieux d'abréviations. Après une période de tâtonnements le lecteur n'aura pas de difficultés pour s'orienter et trouver rapidement ce qu'il cherche.

L'auteur promet de donner, non seulement le vocabulaire de la langue littéraire de nos jours, mais aussi un choix de formes populaires et dialectales, si nombreuses dans une langue littéraire qui se forme sous nos yeux. Un certain nombre d'archaïsmes sont donnés, pour faciliter la lecture de textes plus anciens. On saura gré à l'auteur d'avoir pris en considération les terminologies techniques toujours plus importantes.

Le dictionnaire sera, à en juger d'après le premier fascicule, un outil de travail de tout premier ordre, indispensable pour tous ceux qui désirent s'initier à la littérature géorgienne. Il faut espérer que l'auteur sera à même de mener à bonne fin sa tâche ambitieuse dans le délai fixé.

Hans Vogt, Oslo

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Vol. 1

RICHARD LUCHSINGER zum 60. Geburtstag – on the occasion of his 60th birthday – à l'occasion de son 60e anniversaire

XVIII + 226 p., 74 fig., 1960, sFr. 38.–
Suppl. ad «Folia Phoniatrica»
(Für Abonnenten der Reihe und der «Folia Phoniatrica» sFr. 34.–)

Aus dem Vorwort: In dem vorliegenden Band ist der Versuch unternommen worden, die Mittelpunktstellung der Phoniatrie und Logopädie im Kreise einer Anzahl von Wissenschaften dadurch sinnfällig zu machen, daß jeder einzelne Aufsatz ein Thema behandelt, das die Stimm- und Sprachheilkunde jeweils zu einer der Nachbarwissenschaften in Beziehung setzt. Die Aufsätze lassen sich in der Tat nach den drei Hauptaspekten – dem physiologischen, dem physikalischen und dem psychologischen – gliedern, wodurch die Gültigkeit dieser Aspekte auch für die Phoniatrie und Logopädie aufgewiesen wird. Unter dem physiologischen Aspekt finden sich Aufsätze vereinigt, die ein Grenzgebiet nach der Seite der Physiologie, der Genetik, der physiologischen Phonetik, der Physiopathologie und der Chirurgie hin behandeln; unter dem physikalischen Aspekt hingegen Arbeiten, die zur Aerodynamik, Optik und Akustik in Beziehung stehen. Die Aufsätze, die dem dritten Aspekt – dem psychologischen – zugeordnet sind, beginnen mit einigen Arbeiten aus den Grenzgebieten der Neurologie und Psychiatrie, um den engen Zusammenhang der seelischen Vorgänge mit dem Zentralnervensystem zu unterstreichen, und bringen in der Folge Probleme zur Sprache, die sowohl die Stimmheilkunde wie auch die Psychologie, die Psychoanalyse, die Sprachpsychologie und Sprachwissenschaft sowie die Heil-, Stimm- und Taubstummenpädagogik betreffen.

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